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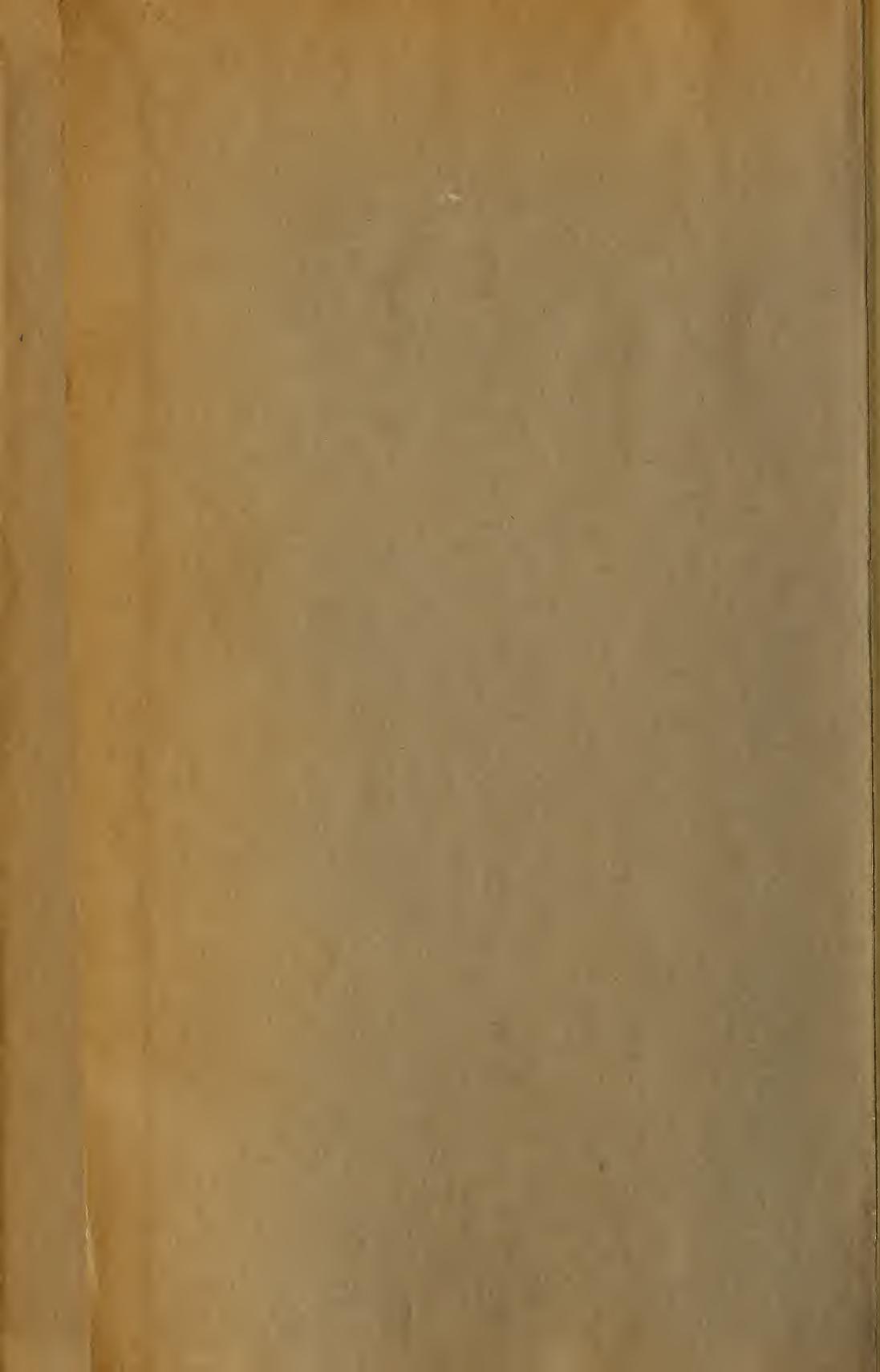


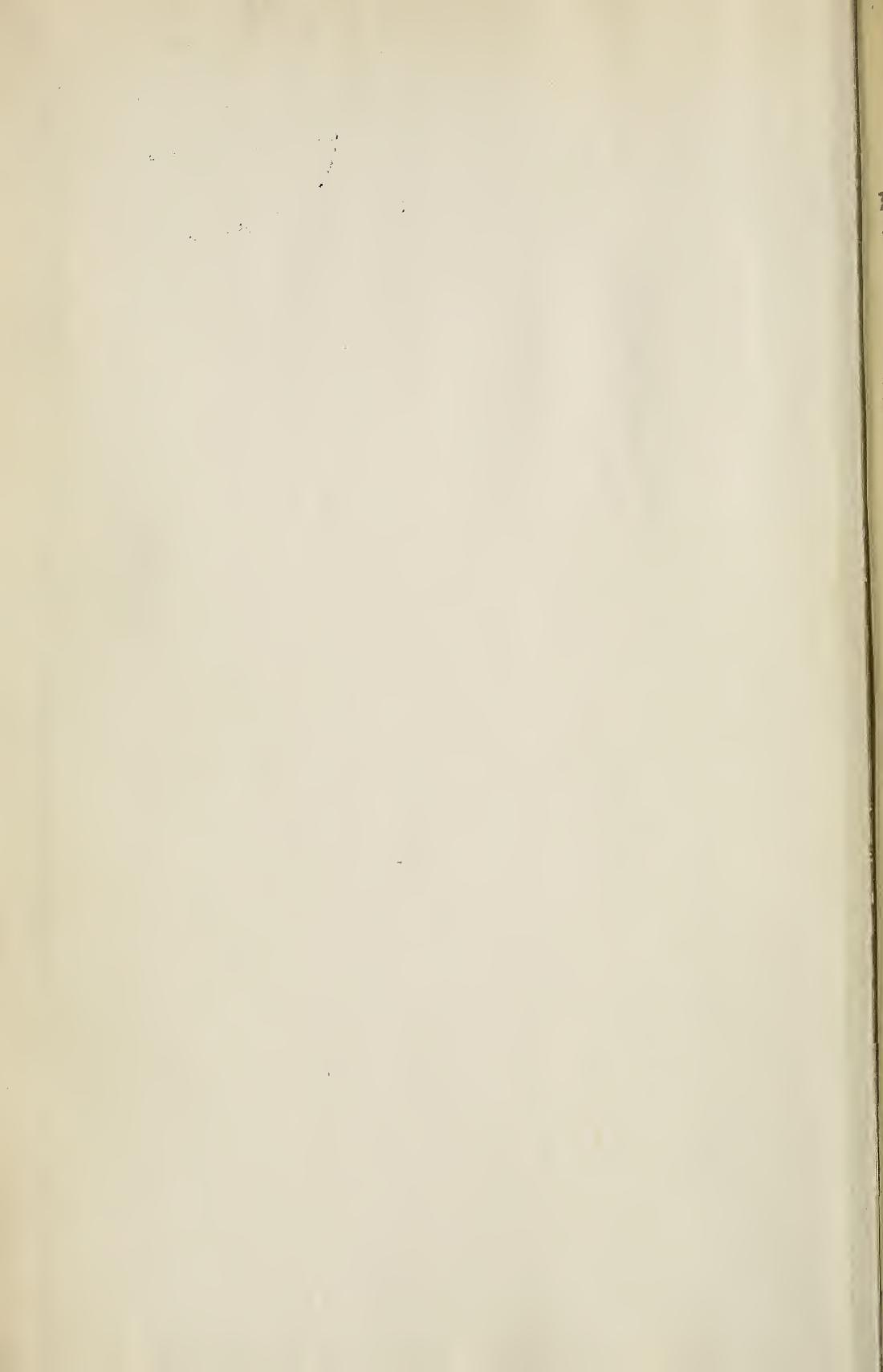
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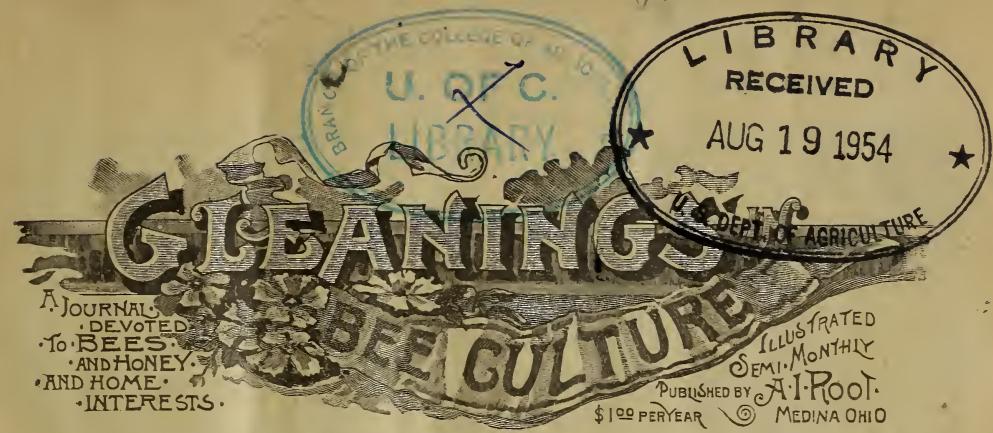
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1893







Vol. XXI.

JAN. 1, 1893.

No. 1.

STRAY STRAWS

FROM DR. C. C. MILLER.

NOW IS THE TIME to melt up your old combs, when they are brittle and you can break them up fine. But be sure to soak them full of water before melting.

"BUCKELBRUT" is the name given by the Germans to drone brood in worker-cells. Bearing of an economical turn they use one word instead of our five.

DO YOU LIKE MILK that tastes rich? I'll tell you what to try. Put a pan of milk on an augite stove-mat on the stove, and let it boil for an hour. There's richness for you.

THAT BEE-ESCAPE of friend Lewes may prove to be a "dark horse." How would it do to punch the holes with a fluted punch, abruptly tapering instead of gradually tapering?

THE SUGAR-HONEY discussion has at least shown one thing, and that is, that bee-keepers can discuss matters about which they feel deeply and differ widely, without losing temper.

BUCKWHEAT is a very uncertain crop for honey, according to replies in *A. B. J. Doolittle* says he had a good yield this year, being the first pound of buckwheat honey in 15 years.

WHILE STANDARD SECTIONS are being somewhat discussed in this country, British bee-keepers are quite stirred up over the matter of a standard honey-bottle (honey-jar we would call it).

PLEASE, MR. EDITOR, don't let York's old man monkey with that gun so near my stray straws. He looks kind o' careless; and if the gun should go off he might burn up my whole strawstack.

THIRTY-SIX STATES, if I a rightly informed, now have laws against selling tobacco to those under 16, and in some States 18, years of age. Wouldn't it be an improvement to raise the age from 16 to 60?

CRIMSON CLOVER, or scarlet clover, has been highly praised as a forage and honey plant. J. Fremont Hickman, of Ohio Experiment Station, says in *Stockman* that it does not succeed as far north as Ohio.

SOME PEOPLE are opposed to alcoholic drinks, but think lager beer all right because it isn't an alcoholic drink. The other night I saw a half-ounce of fourth-proof alcohol distilled from an average glass of lager beer! And people drink it for the hops in it!

"A LARVA 5 DAYS OLD." Does that mean that the egg was laid 5 days ago, or does it

mean that the larva hatched from the egg 5 days ago? Some use it one way and some the other, hence confusion arises. Suppose you tell us which is the better way, Mr. Editor, and then we'll all try to use it the same way.

R. C. AIKIN at the Colorado State convention figured out that, with 100 colonies, a bee-keeper might average \$253.50 for his year's labor, and \$402.50 with 200 colonies. "But," he says, "the average apiarist does not, will not, and can not do it. . . . None but the expert apiarist will make money out of bees."

THE *Apiiculturist* says, "Honey and sugar mixed, say two pounds of sugar to one of honey, is superior in flavor and quality to clear, pure honey." For those who like sugar better than honey, wouldn't it be a still further improvement to replace that one pound of honey with another of sugar?

IN BLANKETING HORSES, a writer in the *Stockman* thinks, it is a bad plan to throw a blanket on a horse immediately on stopping, while he is wet with perspiration, for then the blanket becomes wet, and he has an icy covering; but he says, let him dry off a little before blanketing. Worth thinking about.

THE MANAGEMENT of the North American showed their good sense in having less than the usual number of topics on the Washington program. If you get the bee-keepers together there will be no trouble about topics to discuss. When two bee-keepers meet it doesn't take them two minutes to strike a "live topic."

M. BERTRAND, a prominent French authority, and the able editor of the *Revue Internationale*, thinks that there is a kind of heredity from the nurse-bees, owing to the food given to the larvæ, and on this account he thinks the raising of royal larvæ ought to be entrusted only to those colonies whose workers possess desirable traits.

THE FRENCH HORTICULTURAL monthly, "*Le Cidre et le Poire*," has an article from Paul Noel, in which he says, "The place where bees become useful in the highest degree is in the orchard. Experiments which have been made in this regard are so conclusive, that hives of bees have become the indispensable adjunct of a well-kept orchard."

HERE'S A POSTAL from Hasty: "Brother Miller, you didn't stick that straw through me in the right direction. I didn't say, 'their stores below them,' but 'their stores behind them.' You are aware that, with long and shallow frames, bees incline to store the honey at the rear of the hive, and form the first winter cluster at the front of the hive." Glad to correct. I was thinking of their climbing up, and whatever they left behind was below.

THE BICYCLE may prove a great blessing, even to us clumsy chaps that never risk our necks on them. Never was there any such interest in having good roads as now exists, and I suspect it's mainly owing to the wheel. If the roads are put in proper order for bike-riders, it will make wagons and carriages last a third longer. Success to the movement.

BALKY COLONIES that will not start work in sections are thus treated in extreme cases by Doolittle, as given in *Stockman*. Drum or shake from the combs the larger part of the bees and the queen, and put them in a box or hive; and when they commence to build comb nicely put them back where they came from, using the white combs they have just built as starters in the sections.

LANGSTROTH'S REMINISCENCES.

MORE ABOUT SLAVERY.

For reasons which will soon appear, I have always taken a deep interest in the colored race. My maternal grandmother was a large slaveholder on the Eastern Shore of Maryland. When she was a rich and fashionable widow, the converting grace of God came to her through the ministrations of the Methodists, and she joined their church, although to connect herself with them was almost to lose caste with many of her associates. She had always been a kind mistress to her servants; but under new and better influences she became increasingly solicitous for their welfare. I have often heard my mother say that she never thought of striking one of her mother's slaves, any more than our children would presume to strike one of our white domestics. But this, I believe, was rather exceptional, and children were often accustomed to strike and abuse the colored servants, almost at will. What a training for those soon to become citizens of a professedly republican country!

At that time a constant terror to the slave population was the dread of being sold and carried off to the Georgia plantations. Partis from the South traveled from plantation to plantation, until they had bought enough slaves to suit their purposes. One day some of the colored servants came running to my grandmother, to tell her that a woman who had escaped from her new owner had just come to her premises to hide herself from pursuit. In a storm of seeming anger, my grandmother drove the informants from her presence, commanding them under pain of severe punishment not to speak to her another word. The owner of the fugitive woman soon appeared, to make known his mission. In very few words my grandmother told him that she knew nothing at all of where his woman was hiding, and that, if she could have her own choice, she would have him driven at once from her place; but as the law allowed him to search for her, she could not prevent it. His search was in vain; and a week or more after his departure, the woman made her appearance. She lived as a free woman, and was always called Georgia Jane, and no one ever disturbed her. It must be remembered that, in those days, there were no telegraphs, railroads, steamboats, or even stage-coaches; and the persons who made up those gangs could seldom afford to come back to hunt for a fugitive.

My mother's grandmother had been a very worldly woman. One day word came that she had been converted. A pious old negro woman, when told of it, dropped down on her knees to thank God, and vowed that she would not rise

from them again that day. Mother says she saw her walking on her knees with vessels of milk, to and from the milk-house, and doing all her work in the same way, for the rest of the day. If there was something of superstition in this, surely there was much more of the outflow of a simple heart, full of love to Jesus, and thankfulness that her old mistress had found her Savior.

Long before she died, my grandmother liberated all her slaves. She had done all that she could for their welfare; but the doctrine taught by John Wesley, that slavery was the sum of all villainies, had sunk deep into her heart, and her conscience was never at rest until she had set them free. To the men and women who were able to take care of themselves, their liberty was given without any restrictions. The younger girls were bound out until they were 18 years of age, and the younger boys until they were 21 years old. For the sick and aged a suitable provision was made for life; and my grandmother, from being a wealthy widow, had only enough for a moderate competency.

An uncle told me, that, on a visit to the old homestead, one of grandmother's former slaves said to him, "Massa Jim, you know that they always used to say, that, if a nigger was set free, he was of no account any more, but would only laze about and steal. Now, Massa Jim, do you know of any old missis' servants, that, after they got free, went to the jail or the poor-house?" My uncle could only say, that, to the best of his recollection, none had ever done so. "Now, Massa Jim," continued the old negro, "kin you say as much for the same number of white people, that had as good or even better chances than we had?" "and I could only reply," said my uncle. "No, Jim, I can not."

As my mother had a sister still living there, she occasionally visited her old Cnester town home. This house was near the steamboat landing ~~far~~ her heart was often deeply pained, as she listened to the wailings of poor slaves sold away from home and friends. It was often said, by the apologists of slavery, that such separations of families were rare; but this was far from being so. As in all the border States little or no profit could be made from slave labor, the breeding of slaves for a southern market was quite common; and we all know, even if we have never read Uncle Tom's Cabin, what this implies; and, further, in the settlement of estates it often happened that families were cruelly divided. It has been said, that the colored people felt such separation for only a short time, as the cow and the calf that the butcher parts. If this were so, and slavery had trained God's creatures to be no better than the brute creation, what a terrible indictment must lie against it! It need hardly be said in how many cases this charge against such an affectionate race was the basest of calumnies.

Although the law strictly forbade the teaching of slaves to read, my dear mother, when visiting among her old friends, could never bring herself to respect it. A slave who had passed the middle age was trying to learn from her how to read. His progress was painfully slow, and he was kept in the little words of the spelling-book so long that he begged that she would teach him from the big words, further on. He could be reconciled to more lessons with little words, only when he learned that the great General George Washington had to learn the little words before he came to the big ones.

The following incident was once witnessed by my mother: A colored boy was dragging his little master in a small go-cart, when one of the wheels came off and the little boy tumbled to the ground. As soon as he could recover the

use of his feet he flew at the servant, kicking and biting him, and pulling his hair, paying no attention to his pitiful outcries, saying that he could not help the wheel from coming off.

The hated institution! If possible, its curses rested more heavily upon the whites than the blacks; and it is often difficult for me to realize that I have lived to see it overthrown.

On one of her visits to her sister, my mother was told that an old woman who had been her nurse had walked a long distance, and was waiting to see her. As soon as she caught sight of my mother, crying out, "O Miss Rebekah! O Miss Rebekah!" she folded her in her arms, and wept over her as though she had been her own child. When this scene was over, she learned that an old colored waiter, who had also walked a long distance, was waiting in the kitchen to see her. After an exchange of affectionate greetings, he said, "Miss Rebekah, don't you remember how Jim used to open oysters for you, when you were a little girl?" "Oh! yes, Jim," replied my mother; "I remember it very well." Going to a table, over which a neat napkin was spread, he lifted it off, and there stood the oysters in their shells, all ready to be opened, and the plate on which they were to be eaten. "Now, Miss Rebekah, you must please sit down at this table, just as you did when you were a little girl, and let old Jim open some oysters for you, before he dies." My mother complied with his request, but her tears fell so fast that she was able to choke only a few down.

Yes, there were masters and mistresses who did all they knew how to do for their slaves, and who, no doubt, would have set them at liberty, at any sacrifice, if they could have been made to see that this would better their condition.

L. L. LANGSTROTH.

Dayton, Ohio.

Continued.

WINTERING BEES UNDER SNOW.

DOOLITTLE'S EXPERIENCE.

A correspondent writes, saying: "By setting my bees next to a fence which I have on the west side of my bee-yard I can usually have them covered with snow from one to five feet deep. Will this be a good way to winter them, and would you advise me to do this?"

This is a question which has been frequently asked in the past, and, as a rule, the answer has been, "Yes, let the snow drift over the bees if it will; for, the more snow over the hives the better." My experience has not been in accord with this, however; but I have found that, if the hives are covered two-thirds the way up the brood-chamber, it is a great advantage; but if the hives are covered two-thirds the way up the cap or cover, or completely over, it is a positive damage to the bees, and worse than no snow at all. For several winters, when I first began to keep bees I uniformly wintered them in the cellar; and, not being as successful one winter as I desired, I concluded to winter on the sunnier stands the next winter, and, as the snow fell, sweep it up around them. I did so; and by December 10 the hives were covered from sight, while the pyramids of snow all over the yard made a very picturesque view which was quite enchanting. At the end of a month we had a thaw, when I looked at them and found that the warmth from the bees had so thawed the snow that a small dog or a cat could easily go around between the hives and snow. I was highly elated over the apparent success, and concluded that was just the way to winter bees. I found, however, that the bees were

quite restless, and, upon raising the quilt, were ready to fly out and perish on the snow, instead of being quiet, as all good bees should be. As the next day was fine they had a cleansing flight, and all appeared well. We had little snow the rest of the winter; and when the season fairly opened I found I had 29 colonies left out of 52. This loss was attributed to the severe cold during April and the fore part of May; and I believed that, if I could have had snow to cover them all winter, no loss would have occurred. One thing I noticed, however: All the hives I opened at the time of the thaw had brood in from two to three combs, while in April scarcely a bit of brood was to be found in any hive. Of course, I reasoned that, had the snow continued, brood-rearing would have been kept up, and in the spring the hives would have been teeming with thousands of young bees instead of depopulated colonies, as I then had. The next winter put an end to these visions, however, for this time we had snow to keep them covered from December to April 10. During the fore part of February there came a warm day, so the bees flew finely, and upon examination I found several hives that had brood in four or five frames; while others, that were not buried so deeply, had only a very little brood in two frames. I noticed that the bees in those hives which had the most brood were so heavily loaded with feces that they were scarcely able to fly, while those with but little brood spotted the snow but very little compared with the others. However, I figured that those having brood in about 250 square inches of comb, as some of the best had, would give fifty young bees to the inch; and it was with a look of wisdom that I told my neighbors that such a colony would hatch out 12,500 bees in twenty-one days, and that I expected a rousing colony by spring. Cold weather, with more snow, came, and held so until about the middle of March, when we again had a day that the bees could fly. The bees were all shoveled out, and I expected to see plenty of these 12,500 young bees on the wing; but upon going to these hives I was disappointed beyond measure to find all the old bees dead on the bottom-board, and those young downy bees clustered closely together where they had hatched, in the embrace of death. Not only this, but the old bees had consumed nearly all the honey in rearing these bees, so I had nearly a total loss except the combs.

When the working season arrived I found I was again reduced to 29 to start the season with. The difficulty with me seems to be that, as soon as the hives are covered with snow, the warmth of the bees, combined with the warmth of the ground, makes it so warm that the bees become uneasy, go to breeding, consume large quantities of honey, thus distending their bodies and using up their vitality, causing them to die of old age during February, March, and April, while the young bees have not the usual strength and vitality of bees hatched in September and October to withstand the rigors of winter, spring dwindling and death are the result. I find that what is true of myself is also true with nearly or quite every bee-keeper in Central New York.

I have given the particulars in the above, as it best describes all the cases which I have known where bees were drifted under snow for any length of time. One winter I had snow ten feet deep over a part of the bees, caused by a deep snow and a peculiar wind drifting it over a knoll. I tried as far as possible to keep the front sides shoveled clear of all I could; but I completely lost track of ten colonies; and of those ten, not one was living the first of May.

From the above experience, during fifteen

years or more of the past, I advise all to go slow who are not sure that the plan of wintering bees under snow is a success with them. Try only a few at first, till you know of a certainty that you are right; and then, if your experience proves different from mine, do as you like with the whole apiary.

Borodino, N. Y., Dec. 15. G. M. DOOLITTLE.

SUGAR-SYRUP HONEY.

PROF. COOK REPLIES TO MR. DADANT AND OTHERS.

Digestion is the process whereby the food is so changed that it may pass through an animal membrane, or from the alimentary canal—the stomach and intestines—to the blood. As this process is by osmosis, we may say that digestion is rendering the food osmotic. Usually this is simply liquefying the food, though in some cases, as in blood albumen, the food is already liquid, but not osmotic, and so must be digested. I would not say that digestion is the fitting of the food for assimilation, for this is not true. Some of the digested food, as soon as it gets into the blood, is changed again to fit it for assimilation. This is true of all the peptone, or digested albuminoids. I believe no scientist will take issue with my definition of digestion. The "Century Dictionary" gives just this definition, as does Flint in the last edition of his Physiology. He says it is the change preparatory to absorption.

We eat three kinds of food that need digestion: the others are already osmotic. These are starch and cane sugar; albuminous foods, such as cheese, white of eggs, muscle, etc.; and fats.

The starch is slightly digested, or changed into glucose, by the saliva. But as this is stopped by the acid gastric juice of the stomach, it is unimportant. Yet the sugar so formed needs no further digestion, but is absorbed at once into the blood. The most of the starch, the cane sugar, and all of the fats, are digested, not in the stomach, but in the small intestines, by the pancreatic juice—a juice secreted by the pancreas, a large gland lying just back of and below the stomach—the most important organ, indeed, of digestion. Here the remaining starch and cane sugar are changed into glucose, and the fat changed into an emulsion, called chyle, which can be taken up by the lacteal vessels and carried into the blood. The albuminoids are digested, usually, by the gastric juice, which is peculiar among the digestive juices in being acid. This is all the digestion that is accomplished in the stomach. Indeed, this does not need to be done in the stomach, for, if not done here, an element of the pancreatic juice will do it. This is why a stomach is not essential to life, and why, in case of cancers and tumors, the whole stomach has been removed, the person so treated recovers and becomes sound and able-bodied. We speak, then, of a good stomach, and it is very desirable; but we see from the above that a good pancreas is much more necessary. The cane sugar is changed to glucose (physiologists say, and correctly, too, digested), in the intestines, by the pancreatic juice. Flint says, last edition of Physiology, page 171, "All the sugar of the food is converted into glucose before it passes into the blood." He says, page 248, that the pancreatic juice digests or transforms cane sugar into glucose. This is just what the bees do for us in case we eat honey instead of cane sugar. Yet I do not think this glucose is identical with that made in the starch-factories. The chemist detects no difference, but the physiologist

does. In such matters the physiologist is much better authority than the chemist. His reagents are more sensitive. Every intelligent bee-keeper is physiologist enough to refute the ablest chemist in this matter. So long as our bees refuse commercial glucose until forced to take it, and so long as it is fed with fatal effects for winter use, so long is the argument with the bee-keeper-physiologist.

A word as to chyme and chyle. The first word refers to the material in the stomach, which, as we see, is of a varied nature. It consists of the albuminoids more or less digested, and the starch, except the very small amount digested in the mouth by saliva, the fat, and cane sugar. Of course, the word is no longer of any use in human physiology, and we do not find it at all in many physiologies. It is a good term for the food of bee-larvae. Chyle is used to designate the digested fats, which are taken up by the lacteals.

I have always enjoyed reading Mr. Dadant's articles, even though controversial, as they are candid and cautious; I was surprised, however, at his representation of *my views* in GLEANINGS, Nov. 15, p. 833. I should not have recognized them at all. He says, "Prof. Cook can boast of being the first who wrote that the more or less complete change of food by its mixture with gastric juice is digestion." I must differ as I never said or wrote any such thing. From what I have said above, it will be seen that any such assertion would be absurd. I am very sorry that my friend has any such impression, and I can not see how he got it. If I have written so carelessly as to give any such impression, I beg pardon, and will be grateful to be referred to the article. Mr. Dadant says, "Of course, no savant will say that starch is digested before going into the stomach." I beg pardon; but I think that every physiologist will say that some starch is digested in the mouth. Mr. Dadant is surely alone in this view. Every word that Mr. Dadant quotes in his article from scientists can not hit me very hard, for it is all true, and I accept all of it.

I do say that honey is digested nectar, and I certainly believe that every physiologist—I should not go to a chemist, as this is not in his line—will sustain me, whether he be American or European. They say that cane sugar eaten by us is digested or transformed by the pancreatic juice. They say the bees do the same thing, and Mr. Dadant knows it. I feed 23 lbs. of cane sugar at night, and extract it the next morning, and there is eight per cent of cane sugar and 67 per cent of glucose. Now, friend Dadant, you know that the secretion of the bees transformed this. If you prefer, say transformed. All physiologists call it digestion, whether in America or France. It is digestion, and why not say so? And, friend Root, Cowan does agree with me exactly. On page 7 of his excellent book he says: "The nectar which is gathered from the flowers has been converted into honey by a secretion derived from the salivary glands." Page 119, he says: "The production of a secretion to assist digestion to convert the cane sugar of nectar into the grape sugar of honey." And he quotes Planta, who is surely a savant, to the same purport. Cheshire, 3d. I., pp. 100 and 263, gives exactly the same explanation. So you see, friend Root, both Cowan and Cheshire—yes, and Planta—yes, et al., I am sure, of scientists, teach this, for it is the truth in the matter. Two things I like very much: First, to be right; and, second, to have the support and sympathy of my friends. In this matter of sugar-syrup honey I candidly believe I am right. I wish I had the support of my friends, for I like all of my friends to be on the side of the truth.

These are facts: Honey is the stored liquid product of bees; and, as shown above, this is usually digested cane sugar. In case bees feed on glucose or honey-dew, which is, very likely, glucose, and so needs no digestion, then it would be stored without transformation or digestion. The nectar, which honey comes from, is very varied. It is usually nectar from plants, mostly from flowers; it may be from sap of stubble or maple-trees; then it is cane sugar, just what we feed in feeding cane-sugar syrup; it may be from fungi, as ergot; it quite often is from honey dew, and may be in such cases excellent, or rank and bitter. Thus no man can ever certify that his honey is pure floral honey. In very many cases this would be false.

Honey from cane-sugar syrup, then, is honey. No other position, it seems to me, is possible, else we never know that we have any pure honey. Floral honey is digested nectar plus a trace of formic acid, and possibly other elements from the digested liquid, plus a slight trace of organic element from the flower which gives the peculiar flavor of each kind of honey. This is very slight and mild in clover honey; pronounced in basswood, and sharp and pungent in buckwheat. It is not always desirable. We should be glad to miss it in buckwheat honey. Honey from cane-sugar syrup is the same as the above, except that the last element is wanting. I have shown that this is honey. I had three excellent chemists analyze it, and they could not distinguish it from the best clover and basswood honey. Forty of my students tested it and pronounced it honey of excellent quality. Two of our ablest Michigan bee-keepers, Messrs. James Heddon and T. F. Bingham, pronounced it honey, at our association last week, and honey that is reputed first-class. Read my article, friend Root, and you will see that I did not say that they could not distinguish it from linden honey, though Mr. Heddon pronounced it just that. The chemist could not do that, for the aromatic flower element, even in basswood, is very slight in quantity. We see, then, that it is good; it pleases the palate; it will sell. People will not object to it, for they will have no reason to object. Again, it is wholesome. We feed it to bees, and they like it, and often thrive better on it for winter food than on other honey. Some honey from flowers is not wholesome for people or bees. So we may safely say that this is better—more wholesome—than some floral honey.

You say, friend Root, that we add honey to cane-sugar syrup to prevent granulation. Certainly we add it to cane-sugar syrup, not cane-syrup honey. Cane syrup does crystallize very readily; but cane-syrup honey does not. There is some before me, side by side with basswood honey. They have been together all winter. The basswood is wholly candied, but the other would run out of the bottle. Your experience is not mine. Cane-sugar syrup is changed to honey, and does not readily granulate, while the syrup does crystallize quickly, and so we add acid or honey to prevent it, else our feeders are crusted over with the crystals, and our bees often suffer seriously by being stuck up or coated with the sugar crystals.

But why produce sugar-syrup honey? and why say any thing about it? First, we have found that we can not always produce any other. Such has been practically the case in Michigan for the last three years. Now, if the bee-keeper can secure honey—good honey—despite the season, is it not good to know it? Surely it is, if it can be done at a profit. The experiments here and in Mr. Hutchinson's apiary the past year seem to prove that it can be, by the expert apiarist. I believe I can produce fine comb honey in this way at a good

profit. To my mind, the objections are not valid ones. The arguments for—bread and butter for our loved ones—are *blessed ones*.

"But," says one, "it will simply make honey cheaper, and so be really no advantage." Cheap honey means honey for everybody. Isn't that a pleasant thought? Again, cheap articles sell where expensive ones hang to the owner. Cheap articles are far more ready to become staples. These two aids appeal with the fact of certainty to my ideas of right and blessing. Granting that honey is cheapened, it will not come at once; and in the mean time all who can produce this honey profitably will reap a double benefit.

Again, to feed at a profit requires skill, and will make better bee-keepers, and will reward hard study and effort. Now, friend Root, let us throw aside visionary troubles, our "doubts and fears," and all work for what the truth and fact urges as our right and privilege.

I have no doubt that sugar-syrup honey will be produced largely next year. If it is genuinely good, as I fully believe, and feel sure it will prove, then I have no fear of a market. If it can be produced at a profit, then it will be produced. No one will be wronged, but I believe our whole fraternity will be helped. I know of no class whom I should like to see prosper, with more sincere satisfaction.

A. J. Cook.

Agricultural College, Mich., Dec. 10.

[The following is the article that appeared in the *Bee-keepers' Review*, and which, at the request of Prof. Cook, we publish:]

WHAT IS HONEY? SOMETHING IN DEFENSE OF SUGAR HONEY.

It is not always that our dictionaries are to be relied upon to tell us the truth. This is illustrated by our latest, and, so far as I know, our best, the Century. In it honey is defined as "the sweet substance of flowers, gathered by the bees." It takes but very little investigation to actually prove that this is an error. It seems to me that the best definition we can possibly give is this: Honey is digested nectar. Every one understands that honey is the liquid product of bees which they store in the cells of their comb. This substance has been known from time immemorial as honey. The merest child and the unlettered rustic, as well as the scholar, agree to this last statement. It is a truism too evident for contradiction, too generally recognized to require any argument.

The other definition, that honey is digested nectar is just as true, though not as evident to the unlearned. The definition offends the tastes and sensitive notions of many good people, and especially bee-keepers, who dread to see any—even an imaginary—stigma cast upon their pets or the product of the apiary. Let me urge that any such statement, if truth, need disquiet no one. We all should desire the truth—should willingly dig for it, scatter it where found, and defend it at all hazards, especially so if we have to do with nature's secrets, for these are God's own truths. But why should any one be offended at this definition? We all know that honey is carried in the honey-stomach and emptied from it to the cells of the comb. I think it must come from a wrong notion of digestion. Digestion is simply changing our food so that it can be absorbed. It may be simply liquefaction, though many substances, like blood-albumen, the albuminous material of milk, and cane sugar, may be in solution or in a liquid state, and yet must be changed—digested—before absorption can take place. These substances can not pass rapidly—possibly not at all, from the stomach through to the blood, except that they are digested. Digestion makes them no less clean, no less wholesome, no less nutritious. It simply makes them available, practically useful. Held in the stomach, they would be heavy indeed. Changed by the digestive ferments, they pass rapidly and easily into the blood, and hasten on to nourish the tissues. If we eat cane sugar, we have to digest it; if we eat honey, it has already been digested. Therefore, it may be true, as some physicians have argued, that honey is a safer food for those with weak and delicate stomachs than is our

common cane sugar. We know that certain diseases, like diabetes and Bright's disease, are now more common than of old, and we also know that no revolution in food regimen has been so marked and startling as that from honey to cane sugar. We eat the latter *in extenso*, and have to do what the bees did for our away-back ancestors, who ate few sweets other than honey. Thus no one need or should object to the assertion that honey is digested nectar. First, because it is truth; and, secondly, because this very digestion is in every way wholesome and desirable.

The nectar from which honey comes is very various in its origin, and doubtless quite varied in its nature. Bees get the nectar from flowers, from sap, from fungi, from fruit, and from various insects. While bees get the most of their nectar from flowers, they often get not a little from extra floral glands, as in the case of the cotton, the cow and partridge peas. Maple and other saps furnish not a little nectar, and so are far more culpable than our good friend Hasty, for they gave the bees pure cane sugar years ago, while Hasty only suggested it in this year of our Lord 1891. The sap from stubble often yields very abundant nectar, as do such fungi as ergot, and the bees have no scruples against it, for they gather, digest, and store it, and it is honey. The secretions from insects are treated in the same way. In some cases the resultant honey is dark, rank, and unfit for table use; but in other cases it is delicious, and could not be told by the chemist, nor even by the connoisseur, from even the best of honey from nectar of our best reputed blossoms. Now, if only that is honey which is derived from the nectar of flowers, what shall we call all the other? Indeed, the most of our honey is composite in make-up and in origin. Very much of that which is transformed flower-nectar is largely mixed with that of many different sources. Not infrequently the bees visit groceries, cane-syrup factories, and the maple-bush, and thus appropriate cane sugar unmixed. It is impossible, even if desirable, to secure any honey that we can insure entirely from flowers.

It follows from the above, that any artificial admixture of glucose or other syrup with honey makes it a compound that is not honey. It is a mixture of honey and syrup, and is in part a substance that has not been digested by the bees. It is an adulteration.

From the above, it would follow that honey secured by feeding any nectar is still honey. Is there any avoiding this conclusion? If we feed honey, no one would question the fact that the resultant product is honey. But the bees may have secured the nectar of this same honey from maple sap, from fruit, from the sorghum-factory, or elsewhere. Is nectar digested, or transformed, by the bees, and so it is honey? It may be very undesirable honey, but still it is honey.

Suppose, then, that glucose or cane syrup is fed: I think we must pronounce the resultant product honey. It is digested nectar. But this does no say that it is good or even marketable honey. I am very certain that honey from commercial glucose would not be good. The bees do not like it, will refuse it if any other nectar is at command; will die if fed it exclusively and continuously. If mixed with honey it is easily detected by the chemist, and so any such adulteration can be detected, punished, and so prevented. If fed to bees, I doubt if it could be made a success; and as all such production would be confined to bee-keepers, it would cease, as it would not be to the honey-producer's interest to create an unworthy product and injure his own business. Such honey would be palpably unwholesome; and as I believe it could be detected, it would be possible to prevent its production, should this be necessary. Honey, then, from feeding glucose would still be honey, but it would be inferior, unwholesome, and so its production could be and should be prevented. As it could probably be detected, it could be prevented, should such a course be necessary, which, from the nature of the case, is not probable.

Honey from feeding cane sugar is quite another thing. It is honey, and, so far as we yet know,—indeed, there is no reason to think otherwise,—it is entirely wholesome. It is exactly like the honey from flowers, except it lacks some of the aromatic flavoring substances, which exist in very minute quantities. If fed slowly it would be well reduced by the bees, and I believe few would pronounce it even an inferior honey. Mr. Larabee fed our bees

twenty-three pounds of honey in one night last June. This was extracted the next day, and my students—a large class—all pronounced it undoubtedly honey, and of excellent quality. A lady of my household—the best Cook I ever had—upon being told what it was, said it had the real honey flavor unmistakably, but was mild and pleasant. It is interesting that the chemists analyzed this and classified it with samples of clover and basswood honey of most superior quality.

Yet the honey was rapidly stored, and would certainly have been more like most honey from flower nectar had it been stored in five days instead of one.

If, then, honey from this source is entirely wholesome, of which there can be no doubt; if it is so excellent that forty persons engaged in the study of honey pronounce it honey, and excellent in quality, and if our best chemists class it with the best of honey from the choicest honey-plants, does it not stand to reason that it can be, may be, and, shall we say, ought to be, a product with no tarnished fame or reputation? If, upon further investigation, it proves to be insipid and inferior, then it will be for the interest of bee-keepers, the only ones who can produce it, to see to it that no such article is produced and put into the market. If, as some of our best bee-keepers believe, it is superior as a food for bees, may we not, from parity of reason, conclude that it ranks high as a table commodity?

Mr. Larabee finds that he can dilute extracted honey with 12 per cent of water, and feed it with a slight profit with foundation in the sections, and at a greater profit if he uses partially filled sections. He estimates he extracted honey at eight cents per pound, and the comb at fourteen cents per pound. If the points made above are well taken, then the profit from feeding cane syrup, with granulated sugar at five cents per pound, would be considerably increased. I do not wonder that, in these trying seasons, Mr. Hasty's mind turned in this direction. Surely this is a matter that may well be discussed. Let us not cry knavery or fraud, from imagined dangers, but candidly investigate the matter; and if this course does offer a right and justifiable means to increase our profits, let us adopt it. If, by experience or argument, we can find any valid objection to it, then let it, with all adulteration and with glucose honey, be condemned, forbidden, and the practice of producing it prevented.

I have little to say by way of reply to the above. If anybody besides Prof. Cook himself had told me that he (Prof. C.) wrote the last paragraph (on p. 11), I shouldn't have believed it. As it is, I am afraid our old friend will have to stand alone in his new departure; at least, I sincerely hope there is not another bee-keeper in the United States who will stand by him when he countenances or endorses the idea of putting on the market, in a wholesale way, as honey, an article that has been produced by feeding bees sugar. No one at the convention at Washington indorsed it in the least; and both Prof. Wiley and Prof. Riley expressed themselves emphatically, that cane sugar fed to bees would not make honey. Providing all Prof. Cook says is true, bee-keepers would have to buy sugar to feed their bees while they were getting a honey-crop; whereas, by the usual way the material of which honey is made costs us nothing; and my experience is, that bees will gather more pounds in the natural way than they will take from a feeder—at least, I have never been able to make a colony take as many pounds from a feeder as the same colony would gather from natural stores during the height of the honey season. Now, does Professor Cook really mean to say that 100 lbs. of sugar syrup fed to the bees at night will be found 67 per cent glucose next morning?

Prof. Wiley denied emphatically, before the whole convention (in answer to a question put by myself), that the bees could convert cane sugar into glucose, by taking it from a feeder and depositing it in the combs. He did say, however, that some recent experiments seemed to show that a large per cent of the cane sugar might be changed to invert sugar; and when I asked him whether invert sugar was the same

as glucose, he said, "Oh, no! they are quite different;" and, furthermore, that the change to invert sugar did not make honey. All bee-men are familiar with the fact that cane sugar forms crystals, while honey only candies, and this alone would distinguish the two.

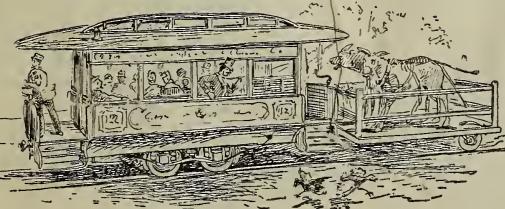
Look here, old friend. Do you remember when you and others went for me so vehemently just because I recommended using grape sugar to start brood-rearing? And you even got good father Langstroth to assist in laboring with me, because the *appearance* of the thing might endanger our whole industry; and out of respect to my many good kind friends I dropped the matter, on the principle that, "If meat maketh my brother to offend, I will eat no meat," etc. Which will damage the reputation of our industry more—what I proposed then, or sentiments in the lines of your last paragraph on page 11?]

A. I. R.

RAMBLE 75.

BEET - ROOT SUGAR - FACTORY; SOWING THE WIND AND REAPING THE WHIRLWIND.

Not many months ago the Rambler found himself with a roistering crowd of eleven car-loads of adult people on the way to Ontario and Chino (*Cheeno*). This was a local political demonstration; and Ontario, where most of the crowd stopped, was surprised at the size of the turnout. Of all the countries for a good-natured, happy feeling and peaceable crowd, South California takes the lead; and one reason for it is the absence of the shillalah element.



HORSE-CARS IN ONTARIO.

Ontario is a thriving fruit-growing town, almost in the shadow of the Sierra Madre Mountains; and, as the name signifies, it is named from the province Ontario, Canada, and a good share of the people are from that wintry country. The traveler can see but few residences; but by a little looking for them they are found embowered in luxurious growths of orange, pepper, ornamental trees and roses, while now and then a well-kept hedge adds variety to the surroundings. As Magnolia Avenue is the boast of Riverside, so Euclid Avenue is the pride of Ontario, and continues seven miles directly up against the base of the San Antonio Mountain. From Ontario the avenue follows a stiff incline, and the two mules that propel the car have a steady hard pull up; but from the way they wag their long ears it is fun they enjoy going down. They are mounted on a special low truck at the rear of the car, and ride down with the rest of the donkeys that are in the car ahead, while gravity is the propelling force.

Altogether, Ontario is a quiet, delightful town; and if some of those Canadians who have

written to the Rambler about coming to California *must* come, let them give Ontario a trial. They will find a friendly and enterprising people; and though they do not believe in annexing Canada to Uncle Sam's ranch, Canadians



are annexing themselves by the thousand every year.

A great impetus to the prosperity of this locality was the building of one of the (if not *the*) largest beet-sugar factories in the country. The Chino ranch, of about 50,000 acres in the immediate vicinity of Ontario, is admirably adapted to the cultivation of the sugar beet. Much of the land is termed moist, for water can be obtained by digging a few feet, and the expense of irrigation is dispensed with. In the season just past, 4000 acres were planted to beets, and the average yield is 25 tons to the acre, and the value is according to the percentage of sugar the beets will yield per ton, which is about 15 per cent, making the beets worth \$4.27 per ton. The amount of sugar made during the season just closed is 8,000,000 lbs. The greatest product in

one single day during the height of the season was 88 tons of sugar, which gives some idea of the capacity of the factory; and, though made on a grand scale, and able to chew up and di-



gest an immense amount of vegetables, still this factory would be inadequate to work up all the beets that can be raised here, and no

doubt others will be built soon. The steam-plow is now turning over the soil of 5000 acres for planting during the coming year, besides another 2000 for barley. The factory gives employment to 300 men; and during the season of work, all is activity; but at other times there is but little to attract the visitor.

The only honey-plant I noticed was a vigorous growth of wild sunflower which crowded almost into the streets of Chino. Bees are, however, not wanted here, and would probably interfere with the operations of the factory, for I noticed much sweetness in the form of syrup exposed, and the honey-bee would be an unmixed evil. But with Messrs. Hutchinson's and Cook's ideas in mind I have been figuring how to turn the product of this factory into comb honey. I think 10,000 colonies of bees could do it by working night and day for eight months. Different grades of honey could be made by taking the

of the question with our present knowledge of bee culture. It is the same with this experiment of Mr. Hutchinson. It is on too small a scale to have practical results. When we compare the sugar product of the whole country with the honey product, into what insignificant proportions the latter dwindles! And even the product of this one sugar-factory is nearly equal to the entire product of California honey in a good season, and beyond it in the season just past. The many uses to which sugar can be put and sold; its cheapness, and the very limited use of honey, and its higher price, will always make the one a staple and the other largely a fancy article; and ideas to the contrary, and for making honey a great staple, are only the theories of an idle dreamer.

Another obstacle to honey becoming a great staple is the uncertainty of the yield and the impossibility of estimating the amount of prod-



syrup in different stages and running directly to the hives. We could thus produce pure Cuba honey, or honey from the hills of Palestine, or any other grade. If sugar-mills rake pure honey, as stated by Prof. Cook, of course it will make pure orange-blossom honey, or any thing desired. I, however, have but little faith in the experiments so far; and before planting 10,000 colonies of bees around the factory I wish to have further experiments tried. No, I wouldn't give a straw for Mr. Hutchinson's experiments; and now that the agitation is on, why can not this matter be tested and settled, so that it will stay settled? Let an apiary of 25 or 50 colonies be set aside for the sole purpose of feeding; let the feeding last for several months, and the amount fed be several tons of sugar. We can take one colony of bees during a good season, and make it do wonders; but to make the whole apiary do the same is all out

for the coming season, while the sugar-factory is so certain of its product as to be able to make contracts a year or two ahead. Now, to resort to feeding sugar to splice out our poor seasons with a makeshift honey is a grand step toward the degradation of our product.

The public demand that their butter shall be made from pure cows' milk; and oleomargarine, which has all the marks of pure butter, but which degrades and unsettles the pure product, is restricted by law. In like manner the public demand that their beautiful comb honey shall be gathered from the flowers of the field; bee-keepers themselves, witnessing the degradation of their extracted product by the introduction of glucose, also demand laws for the restriction of this fraud. Can we not also say that the feeding of sugar for making comb honey degrades the natural product, and is just as much

of a fraud as glucose in extracted honey? and if we ever have a law enacted, should not the restriction include both glucose and sugar?

The Rambler is not disposed to be a "calamity howler," and will not predict dire results in the future; but he believes that our energies should be bent toward securing the law first, then apply the screws, even if they squeeze some of our best friends; and let our motto be, " Pure honey from nature's laboratory, the virgin flowers;" and let adulterations, under whatever specious form, suffer.

In relation to the part our friend Hutchinson has taken in the sugar question. I think things were very quiet in Michigan; and, after surveying the horizon, he proposes to Prof. Cook that they go forth and sow that they may reap. Prof. Cook seemed to agree with the proposition, and forth they proudly marched, sowing sugar, or, shall we say, wind? But there speedily arose a whirlwind for their reaping. I trust our friends will come out safe, but it now looks very doubtful to the Rambler.

[When those sugar-hurricane drawings came to hand, we were a little uncertain what to do, because they seemed to so utterly vanquish (in imagination) our two good friends, Prof. Cook and W. Z. Hutchinson. But the more we reflected upon it, the more we thought there was a little fun that might be indulged in; and as we bee-keepers have a sort of family feeling, we can tolerate little jokes at the others expense. Rambler has cartooned nearly the whole of us; and as nobody has as yet taken very seriously to heart any of the caricatures, we concluded to let the drawings go. Allow us to say, in all seriousness, what we have said, and repeat again, that neither Prof. Cook nor Mr. Hutchinson would for a moment recommend any course of procedure which they had the remotest idea would bring disaster to the bee-keeping industry. No disaster has so come, except in imagination, and we hope never will. We believe the advocacy of the sugar-honey matter in the first place was unwise, and therefore opposed it with all our might; and while we did so, we do not now wish to ridicule the course of two of our personal friends, which we still think is ill advised.]

MANUM IN THE APIARY.

POOR SEASONS: MANUM'S NEW METHOD OF PREVENTING INCREASE: A SMOKER FUEL THAT WILL CONQUER.

"Good-morning, Charles."

"Good-morning, Manum. I thought that, inasmuch as the weather is somewhat threatening this morning, I would not hurry about going to my bees; so I have called to have a chat with you. Why is it, do you think, that basswood has failed to secrete honey this year? It blossomed quite full, and the blossoms looked fresh and nice; but my bees have not gathered a pound of basswood honey."

"Well, Charles, my experience is the same as yours regarding basswood, and I can not explain why it did not secrete honey this year unless Prof. Hick's theory of Saturn's influence on our earth is correct, and that its present equinox is having its effect by so affecting our atmosphere that the secretion of honey is greatly retarded or wholly checked. If his theory is correct, and Saturn does have the influence over our globe that he claims it does, I think we can safely attribute our failure to secure good crops of honey the past few years to that encircled planet. But let us take courage,

Charles, for the crisis of Saturn's equinox is past; and the great rings by which he is encircled are slowly and surely turning from us; and the electric current that has been thrown at us for a few years is now growing less forcible, and our atmosphere is becoming less positive; and, as a passive condition is more conducive to the secretion of honey, we may take courage; and, moreover, as it will be 14 years before old Saturn's rings will again look us squarely in the face, and baptize us anew by showering us with his overabundance of electricity, we may, during that interval, be able to secure some good crops of honey, as of old. Let us watch and see."

"Ha! ha! ha! Well, well, Manum! I am afraid you are getting cranky. But do you really believe that theory?"

"Well, Charles, I know so little that I have to depend upon others to inform me of what there is in nature. If the theory is correct as to the influence Saturn's equinox has upon the earth, and knowing, as we do, that, during said equinox, we have had very poor honey seasons, I think the theory is worthy of some consideration. Who can prove the theory incorrect? As regards basswood, it is a very uncertain honey-plant. Some seasons it secretes abundantly, while at other times it secretes but little, or none at all. Usually it blooms every other year; that is, we expect one-half or two-thirds of the trees to bloom each alternate year, and once in four years we expect all to bloom, and those seasons are when we usually get our large crops of honey, if the weather is favorable for its secretion, and for the bees to gather it. But it sometimes happens that either the weather is unfavorable or the blossoms blast, from some cause or other, and no honey comes from that source. In 1885 basswood blossomed profusely and secreted well; and the weather being favorable during its time of blooming, we secured a large crop of honey, as you doubtless remember. My crop that season was 22 tons from 40 colonies. But I have not had a good crop since. In 1887 basswood blossomed again, but only about half did so; and, again, in 1889 all bloomed; but the weather being so unfavorable at the time, we got no honey from it of any account. In 1891 about two-thirds blossomed, and a partial crop was gathered; and next season (1893) is the year that all the trees are to blossom. But as one-half or more blossomed this year (1892), though no honey came from it, I am afraid the profuse blooming season may be passed over to 1894. However, I have known it to blossom three years in succession, and two of these seasons gave good crops of honey from that source; consequently I am in hopes basswood will do its level best for us next year."

"I believe, Manum, you told me a few days ago, that, when I called again, you would tell me something about your new method of preventing increase. I should like to have you explain it, if you can spare the time."

"Certainly, Charles; I will try to do so. But, really, I do not know whether the method is new or old. But it is certainly new to me; and right here I have 12 colonies that I have treated by the new method this season. These were run on the non-swarming plan. I will first explain how I managed these, and then I will tell you how the same method is applied where bees are allowed to swarm, and where increase is not desired. First, about the middle of May I removed the queens from these 12 colonies, to fit orders for breeding queens. These were among my best colonies that had been fed for some time, to induce brood-rearing. These colonies were allowed to rear young queens. By the time these young queens commenced laying, there was indication of swarming in many of

my other colonies; and as the brood had all hatched in those colonies where the queens had been removed, I exchanged their empty combs for combs filled with brood, from those colonies that were preparing to swarm. I was careful to take only such combs as contained uncapped or very young capped brood, and in its place I put in the empty combs taken from the hives where the queen was removed, and to these I gave the brood. The old (or hatching) brood was left with the old queen, inasmuch as the hatching of the brood gave her more room in which to deposit eggs, and as this exchange was made at the commencement of the honey-flow (the old queen having plenty of room), swarming was prevented—at least, they showed no further disposition to swarm. Now, as young queens very rarely swarm the first season, it is quite safe to rely upon their not swarming; at least, none of these twelve offered to swarm."

"Manum, do you like this plan better than to remove all the queens, as you have heretofore done?"

"In one respect I do, Charles, because, when I have gone through the operation, the work is done for the season, while by removing all the queens we have first to hunt out the queen, then cut out all the queen-cells twice; then the virgin must be introduced, queens reared for the purpose, etc. I have practiced this plan on a small scale three or four years; so far it has worked well. Now, where bees are allowed to swarm, the queens from half the colonies may be removed, as in the case of my twelve colonies I have just told you about, except that they are not allowed to rear queens. They are kept queenless for the reception of any swarm we may wish to hive with them, as those that were permitted to retain their queens will, in due time, swarm out when about two-thirds of the swarm is hived in with one of those colonies whose queen has been removed, and the other third returned to where they came from and there allowed to rear a queen; or the hives may be changed from one stand to the other while the swarm is in the air. This method, however, is not new, as it has been practiced by others."

"I should not like the last-mentioned plan, on account of our large hives—they are too heavy to handle. What is it you are burning in your smoker, that smells so strong?"

"It is particles of propolis sprinkled over the fuel in the smoker-barrel. Mr. J. E. Crane told me of this when he was here a few days ago; and I tell you, Charles, it is worth knowing. I never tried any thing that would just drive the bees out of the way as nicely as this will. I think it would be a good plan to melt up a lot of propolis and dip pieces of wood into it, and keep them handy by, to be used whenever the bees are troublesome, for it will quiet them in a moment."

"Have you seen his new smoker?"

"No. I have not; but, judging from his description of it, I think he is ahead on smokers. I hope it is all he claims it to be."

Bristol, Vt., Dec., 1892. A. E. MANUM.

[We do not take much stock in Saturn's influence through the agency of electricity affecting our honey seasons for good or ill; but we do take some stock in Manum's latest method for preventing increase. Whether it is new or not matters little, and we hope bee-keepers will try it another season. The Crane smoker is an excellent one—the best in our opinion, ever constructed. Whether it can be made as cheaply as other smokers, remains to be proven. We think it can.]

BIOGRAPHY OF LITTLE MISS LEAH ATCHLEY.

A SIX-YEAR-OLD BEE-KEEPER.

The subject of this sketch was born at Lampasas, Texas, Dec. 10, 1886. The first thing she learned to say was "Bees," and point to the hive—this at the age of ten months. She has been trained in the apiary from two years old up to the present time, and this season she has been a great help in the bee-yard. She can graft queens, and rear them herself, after the Doolittle plan, and has had eight out of ten cells accepted, of her own dipping and grafting. She weighs 31 lbs., and is keen, active, and very quick to learn, and has managed her own



MISS LEAH ATCHLEY.

little apiary of six nucleus colonies this year; and when her brother Willie would take a queen from her hives without her knowledge she soon found it out and raised a row about it. Being asked by a visitor one day how she could tell when Willie had taken one of her queens she quickly replied, "I know by looking in my hive and not finding her, and by my bees starting queen-cells," and she never was satisfied, either, till she was paid a nickel.

When doubling-up time came this fall, Willie had doubled her colonies before she knew it. She soon found it out, however, and asked what had become of her bees. Willie told her that he had doubled them up for winter. She walk-

ed up to him very much irritated about it, and said, "Youngster, you let my bees alone or I will double you up. When my bees need attention I will attend to them." She can find and cage queens as quick as any one in the yard, and takes great delight in working with her bees. When no one else is in the apiary she is often seen examining her bees, with smoker (a "Little Wonder" Bingham) in hand; and she has not yet run across a colony of bees that she can not master, for she goes at them exactly right.

This very young bee-keeper will be given her bees in the spring (about 10 colonies) to run her own way, unaided by any one to see what she will do, and her work will be reported next fall.

Floyd, Tex.

MRS. JENNIE ATCHLEY.

HOW MANY BEE-LOADS TO THE POUND OF HONEY?

CORRESPONDENTS OF THE BRITISH BEE-JOURNAL STIR UP AN INTERESTING DISCUSSION.

It seems that the following paragraph—a newspaper cutting—quite inadvertently found its way into the columns of our esteemed contemporary, the *British Bee Journal* for Nov. 24th. As it started an interesting and valuable discussion, we reproduce it here for the benefit of what follows later.

WONDERFUL WORK OF BEES.

Bees must, in order to collect a pound of clover honey, deprive 62,000 clover-blossoms of their nectar. To do this, 62,000 flowers must be visited by an aggregate of 3,750,000 bees. Or, in other words to collect his pound of honey one bee must make 3,750,000 trips from and to the hive. The enormous amount of work here involved precludes the idea of any one bee ever living long enough to gather more than a fraction of a pound of nectarine sweets. As bees are known to fly for miles in quest of suitable fields of operation, it is clear that a single ounce of honey represents millions of miles of travel. 't is no wonder that these industrious little insects have earned the reputation of being "busy" bees.

In the *British Bee Journal* for Dec. 8 a couple of correspondents, thinking that the statements above were too big to be swallowed whole, take occasion to analyze them. The first one, under the appropriate *nom de plume* of An Indignant Bee, replies in this facetious style:

AN INDIGNANT BEE'S FORCIBLE REMONSTRANCE.

Will you allow me, as a humble member of that highly respectable but little understood body, to wit, the bee community of these islands, to draw your attention to some dreadfully misleading statements contained in a paragraph entitled "Wonderful Work of Bees," in your issue of the 24th ult.?

Now, sirs, I have been applying my mathematical knowledge (I presume you will admit we bees know something of mathematics) to an examination of your figures; and, assuming that twenty-five cubic inches (say at the most) make a pound of honey, from your data—"3,750,000 trips for each pound"—I arrive at the conclusion that *your* precious "busy" bee carries each trip a load of nectar containing the ~~contents~~ of a cubic inch, an atom imperceptible. I suppose, without the use of a microscope. What bee among us would have the impudence to venture home with such beggarly pillage? All the sensible "workers" in this 'ere hive were highly indignant at being thus misrepresented, and by our own especial organ, too: indeed, one "good old worker," carried away, doubtless, by passion, was heard to ejaculate "Rot!"

Then we are told that a "single ounce of honey represents millions of miles of travel." Now, I myself, as a rule, like to get my load as near home as possible; but when I have information of a treasure trove, I sometimes scurry around a couple of

miles or so. Well, now, say I fly off two miles and back again, four miles in all; my total journeys (according to your showing) are four times 3,750,000, or 15,000,000 miles to collect my pound of honey; in other words, not much less than one million of miles for an ounce! Is there no discrepancy here, I wonder? To my mind, your statements are erroneous and incompatible—or, to put it vulgarly, they are "all over the shop." I beg to enter my protest against your allowing such loose statements to find their way into our journal, which has hitherto won golden opinions among us for its championship of our cause.—AN INDIGNANT BEE.

[We are quite concerned as to the manner in which we may safely venture to offer our humble apologies for having ruffled the susceptibilities of the "indignant one," whose wrath is poured down on our head as above. If we begin with "My dear madam," the indignant one will probably retort, "I'm *not* your dear madam; in fact, I'm not a 'madam' at all; so don't address me in that way." Then what could we say, for, as "science" teaches, she would be right? And so, having much faith in the *snauviter in modo* when dealing with *Apis mellifica*, we make our best bow and observe: "Look here, old girl"—the "old," bear in mind, always means *young*—we thought it just possible that some of our young fellows, who call themselves bee-keepers, might have been led to take in the figures quoted; but a thorough-going, hard-working, sensible bee, like yourself, with mathematics at your finger-ends as "pat" as some females have knitting-needles—never! Give our compliments to the other indignant ones in "this 'ere hive"—not forgetting the "good old worker,"—tell them all, but tell her especially, it is all "rot," as she beautifully puts it, and that we, from the first, believed it to be nothing else. Tell them also (we must get the blame on to some one's head, you know, that "it was all along of the printer, and that we will, if they decree it so, send you his name and address; and if you want to keep that printer from sleeping for a month, just drop him a line to say that the very first time he comes within sound or sight of a bee-hive, a swarm of indignant ones will drop on his bald head (if it isn't bald it ought to be, and he's *awfully* frightened of a bee). In the meantime, believe us to be still your humble admirers (for even you can not charge us with want of admiration for a "good old worker" bee), and we faithfully promise not to print any thing likely to make you get "waxy" again; in fact, we are ready to promise whatever you like rather than forfeit the "golden opinion" held regarding us by bees in general, and so we still venture to subscribe ourselves your *very own*—Eds. B. B. J.]

[The next correspondent replies thus:]

THE 'SCIENCE' OF BEE-KEEPING; "WONDERFUL WORK OF BEES" (?)

I am a novice in the *science* of bee-keeping, but a great many years ago I very successfully mismanaged some bees. I built a bee-house, had some boxes made of fearful and wonderful shapes, got them staked with bees, and then, from my proud position as an "advanced" bee-keeper, looked down upon my neighbors, who were nothing better than skepiests. In two years I had raised about a dozen colonies, but up to this time all the entries were on the debit side of the account. However, the time has now arrived when the immense profits of my "system" were to begin to pour in. I can not now remember what constituted my special system of mismanagement, but I know it was so successful that, 't the end of another two years, I found myself in possession of a bee-house (the worse for wear), a dozen or so empty boxes (much deteriorated), and a large lump of very dirty-looking beeswax.

My skeppest neighbors appeared to see a comic side to this matter; I never could. I thought I had finally broken ad*g*u to "our little friend, the bee." But a brother in Ontario sent me, as a present, Root's *A B C of Bee Culture* and a year's numbers of *Gleanings*. Needless to say, I enjoyed the reading immensely, and, as I read, I began to feel dimly that possibly I might have made some slight mistakes in my former attempt at bee-keeping; so I determined to "try again," and last autumn obtained two skeps, containing an old stock and a very late swarm; from these I have this autumn gone into winter quarters with four good colonies in bar-frame hives of my own make, and during the summer have taken 4 pounds of honey, about one-

third of which was in the comb. This magnificent triumph did not make me proud. I still nod when I meet my skeepest neighbors, and (when no one else is near) I sometimes even stop and speak to them. No, I am not at all conceited, and to you, Messrs. Editors, I come in all humility as a *novice*, anxious to learn.

Of course, I take the *B. B. J.*, and in No. 544, page 462, I read a short article on which I should like to say a few words. Under the heading, "Wonderful Work of Bees," we are told that it requires 3,750,000 bee-loads to make a single pound of honey! Figures like these take away the breath of a novice, and set him to "figure it out." I suppose there are cases on record of English bee-keepers, during heavy flows of honey, obtaining 3, 4, or 5 pounds of honey in a day from one hive. Mr. Root, under "Basswood," says that his biggest yield was 43 pounds in three days—or over 14 pounds a day; and Mr. Doolittle, in note 13, says that he got 66 pounds in 3 days—or 22 pounds per day. I will deal with this last extreme case—probably the largest yield on record. Supposing the figures to be correct in "Wonderful Work of Bees," the number of journeys to and from the hives to store these 22 pounds would be 82,500,000. Granting that on these days the bees would work full power for 15 hours, that would require 91,666 bees per minute, or 1572 *per second*, to go into the hive, and the same number to pass out. Again, assuming that each bee takes only 15 minutes to gather and deliver its load, and (never resting) makes 60 journeys in the day, then the actual number of bees required to gather the 22 pounds of honey would be 1,375,000, weighing about 275 pounds, or nearly 20 stone, exclusive of the young bees not leaving the hive, and the drones! Truly, it makes a novice's mouth to water to think of a swarm of bees heavier than a sack of wheat and bigger than a feather-bed!

and bigger than a feather-bed! As I do not think for a moment that friends Root and Doolittle would make their statements unless they were absolutely true, I figure above, I find "Wonderful Work" really as there is a manifest mistake in the statement that 62,900 clover-flowers yield a pound of honey, which is carried away by 3,750,000 bees, so that to clear one clover-flower of its nectar 60 bees must each carry a $\frac{1}{62,900}$ pound.

May I suggest, that perhaps it would be near the mark to say that "to gather a pound of honey 3,750,000 clover-flowers must be visited by 900 bees"?—in this case, the latter part of "Wonder Work of Bees" would require to be much modified.—J. W. WILSON, B. (1801) V. 1892.

[Although we have, by a singular coincidence, laid ourselves open to the poking of a little "fun" at our expense by letting the paper cutting referred to as it is in p. 4, we do not quite regret the "slip" as it has shown us that some readers, at least sufficiently alive to the absurdity of the statements regarding bees, which usually go the rounds of the newspaper press, to decline swallowing them without thought or consideration of any kind, as so many d.⁴ As a matter of fact, the paragraph in question was intended to appear "quoted"—as is usual with news and cuttings—and also with an expressive following the title. The omission of these marks, of course, entirely conceals our disbelief in the story, which we had set down as an unusually strong "penny-a-liner." If we could venture to think that the same wide publicity would be given to what appears in our pages this week on the subject as was accorded to the offending paragraph in question, we might say, "All's well that ends well;" but that can scarcely be hoped for, truth being so frequently less acceptable than fiction. In any case, the fact of our being "pulled up"—as we have been in the above two amusing communication—may serve as an explanation why so many of the press cuttings (kindly sent by correspondents) "think they may be of some interest to be kept" and find their way into the waste-paper basket.—B. B. J.]

[On page 61 of our August JUVENILE GLEANINGS, for 1882, E. E. Hasty, of Richards, O., gave some interesting experiments on weighing bee-loads. The results of many tests showed that a light bee-load weighed about 1 grain; a full bee-load (that is, from a bee that drops down at the entrance) was from $1\frac{1}{4}$ to 2 grains. There are 7000 grains to the pound avoirdupois;

therefore, according to Mr. Hasty's calculations, it would take from 3500 to 7000 bees to carry a pound of nectar. We believe this attempt of Mr. Hasty was the first and only one at weighing bee-loads; and in the light of subsequent experiences we believe it to be tolerably accurate. It shows how wide of the facts was the newspaper clipping. It is somewhat refreshing to us Americans to know that reporters sometimes tell big yarns in England, as on this side of the pond.]

THAT SKUNK

E. FRANCE TELLS US HOW TO CATCH AND KILL THEM WITHOUT GETTING INTO TROUBLE.

Oh that skunk! What about it? Why, it has been after my bees. The 26th of November, my son, N. France, and myself went out to fix in the straw to our last yard of bees. When we got there we found skunk-tracks in the snow. It had been to every hive in the yard. From two hives he had worked the bees out at a great rate, and, to all appearance, it had been coming there every night for a long time: in fact, it understood how to get the bees out of the hive and eat them. Of course, it must be killed. Newell tracked it home to its hole, a quarter of a mile. We had no traps with us, so we had to go home and let it work until we could come back again; but the next day was Sunday we did not go back again until Monday. Then Newell took eight good steel traps and set them all for the skunk. As I was setting traps I gave him instructions how to set them. To save trouble after it was in the hole, it was to cut a sapling large enough so the skunk could not move the trap toward its hole. After setting it in the mouth of the hole, he was to fasten the trap on the sapling and drag it back the whole length of the chain, so the skunk could not get down into the hole with the trap.

The next morning I went with Newell to dispose of the game. We found it in the trap all right, caught by the foot, and it was down in the hole the length of . We pulled on the sapling slowly for a couple of minutes, when the skunk came out of the hole and took a look at us. We gave time to make up its mind that we were not going to fight with it; then we pulled the pole, top end first, toward a creek, about 20 rods away. We went slowly at first until the game got used to it. We got it to the creek and dragged it into a deep hole of water. When it was in the water, all it thought of was to get out; but the trap held it there, and it was soon drowned without raising any smudge.

As I am an old trapper, and have had to handle a great many skunks, and I see that quite a large number of our bee-men are troubled with them, you will excuse me if I make a few remarks about handling the animal. In the first place, I don't think that one skunk in fifty ever molests the bees; in fact, this one that we have just killed is the only one that has ever disturbed our bees, to our knowledge; and I believe that I could detect him as quickly as any other man, and I am just as ready to kill it as any man when I prove him guilty of mischief, either with the bees or poultry, or in other ways doing damage. But I won't condemn the whole tribe because I have found one in mischief. The average skunk is a friend to the farmer. It gathers bugs and grubs all summer, and makes nearly all of its living from those pests of the farmer, and so I won't hurt the much despised skunk unless I know it is in mischief. When we find one is doing damage,

it is very easily got rid of. It is a very easy animal to catch in a steel trap. It won't make any smudge when it is caught, if there is nothing there to scare it. It never uses that dreadful weapon but in self-defense. When you have got it in a trap, don't scare or fight it; come up to it carefully and slowly; make friends with it; talk to it; work up slowly; watch its tail. As long as it keeps its tail down there is no danger; but if it raises its tail, step back—there is danger. Don't make any quick motions. Work slowly and carefully. It may take half an hour to get up to it, near enough to move it away or work close by it. You can easily make friends with it, if you don't work or approach it too fast. The trap-chain may be tangled, or wound around something, so that it must be free before you start to move the animal; but by taking a little time, and being sure not to scare it, the trap-chain can be easily got free; then fasten the trap to a pole of some kind—10 to 15 feet long. Now take hold of the other end of the pole and slowly pull it along toward some water deep enough to drown it. If the work is done carefully you won't smell the skunk at all. But perhaps you have not any water-hole near enough to go to. Then, perhaps, the best way is to shoot it. In that case, take a shotgun; put in a good heavy charge; stand about ten feet away; give a side shot; shoot it through the small of the back, as that will paralyze the whole hind parts, and there will be no smell. But that will spoil the skin for fur. A friend of mine has trapped them for the furs, and he carried a knife about four inches and half an inch wide, stuck in the end of a broad scabbard. After making friends with the skunk he stuck it before it and stuck it as you would a pig when it would feed to death. Mind, he did not catch the skunk and hold it to stick it, but stuck it standing without being held, except that it was in the trap.

HOW TO PRESERVE COMBS.

To preserve combs from the ravages of worms and mice (see GLEANINGS, Dec. 1, Secy Straws). I have a room in one of my buildings 10x12 feet, 7 feet high, lathed and plastered; one window and door; cellar under the room. Combs put in there in the fall, and frozen during the winter, are safe for any length of time. I hang them half an inch apart. In the spring and early summer, if I have combs in our out-apiaries that are beginning to show worms, I bring them home and put them in this same room and smoke them heavy with sulphur. One smoking with me is enough to make a sure job. I have a little sheet-iron stove down cellar, in which to burn the sulphur. A four-inch pipe takes the smoke up through the floor into the room. When I have only a few combs, and don't want to make a dense smoke in the whole room, I hang the combs in extra supers, and pile them up over the stovepipe hole in the room; cover them up tight; then smoke them as hard as I please. I never fail to kill everything in that pile of combs, big worms and little, and eggs—all are killed the first smoke.

WHERE THE CLUSTER OF BEES SHOULD BE FOR WINTERING.

In *Stray Straws*, Dec. 1, Dr. Miller quotes Hasty as saying, "A cluster formed touching the top, and stores below them, is very much safer than a cluster formed away down, and stores above them." I think Hasty is mistaken for outdoor wintering. We winter outdoors several hundred colonies every winter; and at the approach of frosty weather they cluster below the honey. The most of our bees are on frames 21 in. deep. If we raise the honey-board now in December, there will not be a bee to be seen. They are away down below their stores,

and that is right. Bees clustered above their stores will starve if there is a long cold spell. The heat from the bees rises. The bees can work up but not down in very cold weather. I have over 100 colonies in L. frames. I always winter them on two sets of frames—one set above the other. I want the upper set to be solid full of feed. The lower set must have empty combs enough for the bees to cluster in, for the reason that they can not live among full combs of honey in cold weather. They can not keep the honey warm. When bees cluster for a cold snap they crawl into the combs, a bee in every cell; then bees in the spaces between the combs, making a solid ball of bees. In that way they keep warm. They cluster close to the feed, but not among it. Bees will work off sidewise to get feed; but if there is feed above them they will work up, where it is warmer.

THAT BEE-KEEPERS' UNION.

Now a few words about the Bee-keepers' Union undertaking the job of putting down adulteration in honey. It is a big fight. The Union is not strong enough. The Union has done splendid work; but unless we can get a great many more members I don't believe we had better undertake too much. I had rather see another society formed to fight the adulterators; then, if we can get enough members in the new society to make any thing of a successful fight, by a vote of the two societies the two could join in one. But don't spoil the old Union by loading it down with more than it can carry.

E. FRANCE & SON.

Platteville, Wis., Dec. 13.

Your experience with regard to the proper location of a cluster of bees for outdoor wintering is exactly ours. We don't remember that we ever lost a colony when the cluster was below the honey—so far down as to make the hive appear almost empty. When the packing material was removed from the top; but we have lost them when the bees were on top of the honey.

In regard to skunks, we have never had any evidence either to corroborate or disprove that of Mr. France. The most of us will have to accept his instructions, without argument. With regard to the Bee-keepers' Union, we feel that an association that is protective ought also to prosecute adulterators, as well as defend bee-keepers from unjust accusations of ignorant bunglers. One that has both functions will secure a larger membership than a union having either one of the powers alone. It is a large membership we want and we have.]

A BACHELOR'S PROTEST.

ONE OF MILLER'S VICTIMS: A MATRIMONIAL BUREAU FOR CALIFORNIA "BACHES."

Mr. Editor:—Let this thing stop right here. Do put muzzle on the Rambler. He is not only "traveling" himself, but he is undoing, or rather "doing up," the rest of us bachelors in a manner truly scandalous. When he came among us something like a year ago, no one suspected his true character or thought to look and see whether he had cloven hoofs. We saw in him only nondescript individual of roving tendencies, traveling bee-monger, a wandering Kodak end, in station rather above the ordinary trap or "blanket man," yet considerably lower than the angels. He was a stranger, and after the manner of the country, we thought to take him in. But he proved to be foxy, this planet or shall we say comet? in the apiaria system, and instead of paying

an exorbitant price for an inferior or foul-broody apiary, he inveigled one of our leading apiarists into leasing him a choice ranch on terms exceedingly favorable to "ye traveling man." Then, instead of staying at home and herding his bugs like a respectable bee-man, this Rambler developed a decided mania for spying out the country and making remarks more or less vile about the inhabitants thereof, through the pages of GLEANINGS.

But, "the worm will turn;" "the galled jade winces," and I kick. The cinch pinches, and I buck. Rambler knows from sad experience what that means.

Neighbor Ferguson and I took Rambler's account of the Grayback trip good-naturedly; but when that shameful "California Flap-jack Act" appeared, there was a "blood on the face of the moon." Then good Dr. Miller suggested the propriety of pulling down my vest and hunting a wife, or words to that effect, and this last "straw" had the proverbial effect of dislocating the spinal column of the patient *camelus*. Then came a letter of inquiry from a chap "way down in Tennessee," who chuckled over my discomfiture, and I realized the necessity of using some ink—of "shooting my dye-stuff," so to speak. However, the Rambler poured oil on the troubled waters by sending me a letter in which he inclosed some "crocodile tears," expressed regret at the mischief he had done, and explained that GLEANINGS' artist was responsible for the unholy display of tongue on page 768, to which Dr. Miller alludes in words "writ sarcastic." Is it possible that, in their laudable efforts to produce a race of long-tongued bees, the GLEANINGS' outfit have got "side-tracked," and are trying to produce a longer-tongued bee-keeper? And would the new feature be extended to the bee-keeper's wife? Heaven forbid!

Now, GLEANINGS for Dec. 1st lies before me; and after reading Bro. Root's advice on page 898 I am constrained to make some remarks. Uncle Amos' suggestion of suicide as a possible means of escape for such unhappy mortals as myself is doubtless a good scheme; but I could never do it during the watermelon season—never!

Bro. Root speaks of "lonely ranches where bee-men stay year in and year out." Those men are doubtless the ones who trouble the conscience of the senior editor. Personally I have had little experience of that sort, and have usually spent more than half the year in a very different line of business, and my aparian life is a source of rest and change, as well as pleasure and profit. One grows weary of the restless struggle for existence in town and city, where "man's inhumanity to man" is seen oftener than the kindly "touch of nature" that "makes the whole world kin," and welcomes the coming of the season when he can "go off, 'way off," and for a few months revel in the sunshine with "the blessed bees," beautiful birds, and beloved books. Until reading Bro. Root's advice I had fancied my simple happy life in the companionship of old Nature, who "ever faithful" is to such a trust her faithfulness, and "communes in various ways" with them, rather harmless; and never has the peal of church organ or chime from cathedral spires inspired within my soul "so calm, so deep, so holy a feeling" as came over me when first I climbed the "tall cliff that lifts its awful form" above the canyon where my cabin now stands. I was hunting a "ocation," and, leaving my pony at the foot of the mountain, I reached the summit just as the sun burst into view over old Grayback, and the morning breeze tossed and rolled the sea of fog that filled the valley below into great billows,

till it looked as I have seen the ocean in a storm. As the grandeur of the scene came over me, lifting all that is best within me toward the infinite, a sense of "the peace that passeth understanding" came with it, and I exclaimed, "Here we rest!" Yet Bro. Root thinks me a miserable sinner, and "quotes Scripture" to sustain his position. What the sage of Medina thinks is doubtless this: If in that wild canyon a lonely bachelor can find health that makes very existence a joy, sermons in its stones, old friends in every flock of feathered visitors, a constantly recurring benediction in its glorious sunsets, and, above all, is raised to a sense of oneness with the Unseen by the matchless beauty of its summer nights, to what heights of ecstasy might he not soar with a congenial mate to share his joys and sorrows? I believe Uncle Amos is right, and must make haste to "secure the substance ere the shadow passeth," for surely the balmy winds would waft to us a "breath from Eden's bowers," and "two souls with but a single thought" would walk in the garden, as did that first pair of which we read in the front part of the Book. Often have I wondered what purpose in the great economy of nature that fig-tree has, that grows wild below my cabin. Now I *sabe!* But right here the Rambler gets in his wicked work, and renders vain my hopes of earthly paradise; for what fair one would set foot in Wilder Canyon after seeing the "California Flapjack Act?" My chances would be better were said canyon the regions described by Dante, with the legend inscribed upon its rocky walls. "Leave hope behind who enters here." Verily I am out and injured, and the Rambler is to blame. Mr. Editor, please muzzle the "critter," or at least keep him on a chain, and don't permit him to scatter all over the country in future.

In closing, permit me to suggest that, if Mr. Root would establish a matrimonial bureau at Medina he would become a national benefactor and, it may be, ease his troubled conscience. Children would rise *per se* over the country and call him blessed! We need the gentler sex in California, and could arrange to have them sent us in carload lots, F. O. B. (which means *For Old Bachelors like*)

H. E. WILDER.

Riverside, Cal., Dec. 14.

P. S.—I should be pleased to hear from any bee-keeper who thinks that wilder surroundings would be congenial. My canyon is wild, and I am

WILDER.

THE DOVETAILED CHAFF HIVE.

WHY W. C. FRAZIER PREFERENCES IT AS A GENERAL-PURPOSE HIVE.

The best hive that has been put upon the market up to the present time is the Dovetailed chaff hive. This hive, as the name implies, is dovetailed. It is made of three-eighths lumber, double-walled, with a space of about $2\frac{1}{2}$ inches between the walls. This space can be filled with sawdust, chaff, or, best of all, with ground cork. The hive itself weighs only 4 lbs. more than the single-walled hive. The cork packing weighs only 4 lbs. extra, this making the hive weigh only about 8 lbs. more when packed than the single hive, and gives a hive that will protect bees on the summer stand in almost any climate. But the greatest thing, and most advantage, is in having a hive that will protect the bees in the spring. It is intended to use this hive with a super on through the winter, in which there is a chaff cushion. Some of us don't find it convenient to use chaff cushions, on account of the trouble to make them, the time used in putting them on, and in removing

them and taking care of them until needed again. The need of a cushion can be obviated by cutting the lower inside corner of the regular cover a very little with a plane, thus making it fit the same as on the regular Dovetailed hive. This, all who use them will find to give a hive that is very much better than to have to keep a super on them all the time.

This hive takes the regular Langstroth frame, $17\frac{3}{4} \times 9\frac{1}{4}$, and is intended to hold 8 frames, and room for a follower and wedge. The design is to use the self-spacing Hoffman frame. Those frames have been on trial now for two years. If you intend to remove your bees from place to place, or haul them in any way, this frame is what you want. When they are keyed up properly they will stand a great deal of rough usage, without breaking down, especially if in wired frames. This frame was intended to be one on which there would be no brace or burr combs built; but in this respect it is a failure. It was also intended that the bees should not propolize the frames together, but somehow the bees could not see it that way. They propolized the frames together so well that three or four can be taken out together without coming apart. They build burr-combs from the frames to the cover-board in nearly every hive; and they so effectually build brace-combs between the frames that a hive might be turned over and handled in the style the baggagemen handle trunks, without the least danger of the frames becoming loose.

I have over 200 of these frames in use at present, and speak from experience. I think the trouble is in grooving the comb-guide out of the frame. The thick-top frame $1\frac{1}{2}$ gives the finest combs in the apiary, perfectly straight, and not a brace or a burr comb in a hive full of them. If frames could be gotten with $1\frac{1}{2}$ top-bar, and otherwise the Hoffman frame, I think they would be about the thing. The tendency to propolize the frames together can be overcome by rubbing the parts where they come together with cosmolene. This is inexpensive and effectual. Any super used on an eight-frame hive will do for this; but the regular dovetailed super, with pattern slats, will be found the most convenient; and the matter of sections is worthy of some attention.

It will be found that bees fill and cap sections quicker if they are not too thick; and narrow sections will be built as straight if foundation is used, without separators, as wider ones with separators. I mean to try eight to the foot next season, if pattern slats can also be secured.

This hive costs one-third more than the regular single-walled Dovetailed hive. It is better to use them, and keep one-third less bees. The honey the colonies in them make will more than pay for the difference in cost. Colonies that were even in the spring, if one is in a single-walled hive and the other in a packed chaff hive, the one in the chaff hive will build up and be in much better shape for the harvest than the other, all else being equal.

To make assurance doubly sure, I shall leave my Dovetailed chaff hives out until settled cold weather comes, and then set them in the cellar.

Atlantic, Ia., Dec. 7. W. C. FRAZIER.

[It was not claimed—at least that impression was not intended to be conveyed—that the Hoffman frames would not be stuck together with propolis; in fact, it was explained by us that two or three could be lifted out at a time because propolis would hold them together. See May 1st, 1891, p. 369. We have never tried vaseline; but from the number of favorable reports we have received we have no doubt of its success for the purpose.]

We can not understand why you should have

had burr-combs when all the rest, with one other possible exception, report no burr-combs with these new top-bars. Let's have reports. If bee-keepers generally prefer the $\frac{3}{4}$ -inch top-bar without being molded out so as to leave the comb-guide in relief, we can give it to them at the same price.]

CALIFORNIA FLORA.

EFFECT OF CLIMATE ON THE SECRETION OF NECTAR.

All countries or sections of countries where dry warm climates predominate, possess the most superior honey-flora. In proof of this assertion, make a note of Southern California, parts of Nevada, Arizona, and Colorado. The indigenous honey-plants in the above-mentioned sections are rich in nectar of the choicest kind. Aside from the wild bloom (where water can be obtained), alfalfa, the great desert honey-plant, will revel in its glory and furnish an abundance of nectar. The honey gathered from alfalfa in the desert regions is very superior to that gathered from alfalfa along the moist river-bottoms of the San Joaquin and Sacramento Rivers; in fact, alfalfa yields a great deal more honey per acre in these desert lands.

Not speaking of the irrigated districts of alfalfa in Southern California, Nevada, Arizona, and Colorado, there are no better honey-producing lands on earth. California, with its white, black, blue, and yellow sages; sumac, California lilac, alfalfa, alfilarie, button-bush, holly, incense cedar, and folocio (California lilac, holly, incense cedar, and folocio are Eastern and Northern California honey-plants); Nevada, with its yellow sage, alfalfa, willows, and hundreds of lesser conspicuous honey-plants; Arizona, with its numerous species of cacti, which produce honey in enormous quantities; its mesquite and other wild honey-plants, and its immense tracts of alfalfa; and Colorado, with its Rocky Mountain bee-plant, vast tracts of alfalfa, and thousands of other bee-flowers which bloom in lavish abundance, gives but a faint outline of some of the sources of honey in these favored bee-lands.

It is strange, but nevertheless true, that the best honey is produced in a country having a dry warm atmosphere; the more moisture there is in the air, the less nectar there is secreted, and it is also more inferior in quality.

And, again, there is something strange how a plant will yield honey one day, and the next it will not. It must certainly be an atmospheric influence of some kind that starts and stops the plant from secreting nectar. Possibly electricity has much to do with it; may be a certain quantity of this element is required to start nectar, and a certain other amount to stop nectar secretion. Just before a thunderstorm there is more nectar in the flowers than at any other time; on these occasions the flowers seem to yield all their nectar at once; for in a day or two afterward they are destitute of it, and it requires several days for them to recover their original prolificness of nectar again. Some persons may think that the rain washed all the nectar from the flowers; but I will state that, in thunderstorms with but a few drops of rain, it is the same.

In view of the above facts, it is quite certain that the amount of nectar secreted in the flowers is due to certain atmospheric conditions or influences with which we are unacquainted. There are seasons when every vale and hillside is a perfect hot-house of bloom and blossom; still there is no nectar in the flowers. Again, there may be a profusion of bloom and an im-

mense crop of honey may be gathered. Scarcity of bloom is no indication that there will be no honey crop.

Some seasons are a great deal better than others. In California we depend to a great extent on the amount of rainfall for the abundant secretion of nectar. In irrigated alfalfa districts the secretion of nectar is about the same one year with another.

Some plants yield honey every season, some every other season; and, again, some once every three or four years. Among this latter we may mention the locust; the apple-blossom yields nectar only about once every third season; holly, every other season; manzanita and the sages, every other season, although the manzanita yields a little honey every season, enough to start them to building comb pretty lively. The wild coffee, so far as my experience goes, yields about as much nectar one season as another.

There are some seasons when every plant, tree, and shrub seems to yield an abundance of honey. We frequently hear the following: "Mr. A. never had a better honey crop; every thing is filled to completion; hives running over with bees." Mr. B., but a few miles away, reports bees on the verge of starvation; will have to feed them all unless prospects change.

Now, why this wonderful difference? Some seasons bee-flowers in certain localities yield nectar profusely, and the next season very sparingly. The chances are that the next season Mr. B. will have the big honey crop and Mr. A. will not do half as well with his bees.

In regard to the prolificness of nectar secretion in bee-flowers on the Great American Desert, it is certain that the more fiery portions of it tend to dry all the moisture from the air; and this moisture produces that favorable atmospheric influence necessary to the secretion of nectar.

Still, perchance the soil plays a prominent part in nectar secretion. Most of the desert soil lacks a certain per cent of humus, or vegetable mold, and is best supplied to this soil by turning in a crop of alfalfa or sweet clover.

Sweet clover is beginning to be considered an excellent forage and honey plant, and is also very valuable for enriching alkali soils. In Utah and Nevada it flourishes without the least care and attention, and year by year it is steadily increasing the fertility of the land. It is stated by good authority, that a good deal of honey that is accredited with being gathered from alfalfa is in reality gathered from sweet clover. In California, white and red clover do not amount to any thing as honey-plants. The climatic influences here are not favorable for honey secretion, as in the Eastern States.

I once sent to A. I. Root and obtained a few small packages of the seeds of honey-producing plants. The seven-top turnip, Simpson honey-plant, and spider flower, all came up and grew well, and in time bore a profusion of bloom. The seven-top turnip blossomed at a time when a multitude of superior honey-bloom predominated, and, of course, was neglected by the bees. The Simpson honey-plant blossomed at a favorable season of the year, but attracted no bees. The cleome, or spider-flower, was a decided success. Every morning, from the interior of each flower depended a small crystal ball of nectar, and it was music to the bee-keeper's ears to hear and watch the bees as they hummed and quivered around these scented blossoms with their crystal sweets.

A Southern California bee-keeper sent to Cuba and obtained the seeds of the great Cuba honey-plant, the bellflower. The plants flourished well in this climate, but were a failure as regarded nectar secretion.

In California, honey-plants yield best when the temperature registers about between 80 to 90°. Cold winds are very unfavorable for honey secretion; but the warm winds bring the right temperature and atmospheric conditions.

When the unfavorable winds are blowing, bees are very vindictive and cross, and difficult to manage; but let the winds change, and in a marvelously short time bees are remarkably gentle and quiet.

Taken all in all, the laws governing the secretion of nectar are somewhat shrouded in mystery; but in due time they will all be cleared up.

S. L. WATKINS.

Grizzly Flats, Cal.

BEE-ESCAPES.

THE PRINCIPLES OF THE PORTER AND OF OTHERS COMPARED: THE TIME REQUIRED TO RID BEES OF A SUPER, ETC.

In *Stray Straws* for Nov. 1, Dr. Miller asks: "Will an escape make quicker work in daytime or at night?"

With your permission, Mr. Editor, I will try to answer Dr. Miller's inquiry; and, for the benefit of all parties concerned, give some of the details of the experiments with bee-escapes, and the facts gleaned thereby.

Many of the readers of *GLEANINGS* remember that the writer had the pleasure of testing what has proven to be the only practical and convenient bee-escape now before the public (the Porter spring bee-escape), before it was placed upon the market. All the forms of escapes known at that time were tried, and all, except the one so widely known now, from the defects of the little machines or the peculiar habits of the bees, proved to be unsatisfactory. The spring escape was tried in all conceivable forms—perforated tin tops; perforated tin tops and bottoms; two or more exits; with springs closing up to side walls or partition in the escape, similar to the so-called Hastings escape. Several escapes were placed in one board to ascertain whether or not the bees would leave the supers quicker through several exits than through a single one. These tests were made both night and day, through good and bad weather, both cold and hot, and when there was an abundance of nectar in the flowers, and when there was neither nectar nor flowers; and the facts gleaned from these experiments, we believe, will ever remain unchanged.

The present form of the Porter spring escape is the best that can be devised for thorough, practical work. Escapes with single springs pressing against the side walls or partitions in the escape clog up with dead bees, where double springs do not, simply because the double springs give a larger opening with less pressure than can be had with single springs. To an observing mind it would naturally appear that escapes with several openings, or perforated tops and bottoms, would give better satisfaction in the matter of ventilation; but many practical tests in this direction show that a single exit, together with the cracks at the joints of the hives, made by adjusting the escape-boards, give all the ventilation that is necessary or desired.

As to the rapidity of the working of escapes, when they work best, etc., I give the following from a small circular published by the Messrs. Porter:

"Owing to the varied dispositions of the bees of different colonies under the same conditions, there is a great difference in the length of time occupied by them in passing from the super; and with the bees of the same colony, the size

of the super, the time of the day, the state of the weather, the presence or absence of a honey-flow all have their influence to vary this time. As a rule they pass out most rapidly when all conditions are such that they are naturally the most active."

As bees are more active during daytime than at night, they leave the supers more readily during the daytime. Bees, too, that, under the influence of a good honey-flow, would leave the supers in a few hours, may, in a time when there is no nectar, and the weather is cool and cloudy, be as many days in deserting the supers. Thus it will be seen that those who wish to accomplish the most that is possible with the best escapes must work when all things combine to their interest.

As to the difference of time occupied by the bees of any colony passing from a super through a single escape, as compared with several escapes, it is not discernible. A whole colony could pass through a single escape in less than one hour, if their anxiety to move out could be awakened to such a degree as to cause them all to want to get out in that time. But as there is no way by which such an anxiety can be awakened, the only thing to be done is to allow them their own good pleasure: and in this direction a single escape is better than a dozen, as there is less heat from below through one opening than through several.

Liverpool, Ill., Dec. 1.

S. A. SHUCK.

A NOVEL IDEA.

A CHEAP HOME-MADE BEE-ESCAPE THAT DOESN'T COST A CENT.

To those wanting super-cleaners for next season, but who did not realize enough from this year's honey crop to pay for them, I will try to explain my plan, which will not cost them a cent for material, and but very little labor to try it. All that is necessary in order to clean a super of bees is to shut them off from communication with and the heat of the brood-chamber, and then leave a door for their escape. But in warm weather this door must prevent them (or others) from going back. This I accomplished with seventy-five colonies, without a failure, last season, by simply fastening a sheet of newspaper over the pattern slats of an empty super, or section-holder. This cuts off most of the heat, and leaves $\frac{1}{2}$ inch space between the surplus and the brood, when in position. Then for a door (connecting the two) or escape, take a stick $\frac{1}{2}$ inch square, sharpened from the four sides, and with it punch several holes down through the paper. Do this over the center of the bee-space between the slats, and you will have a combination of the spring and cone bee-escape, and I doubt its infringing on either of them. Put it on the hive in the evening; and if all of the bees have not passed through it from the supers above by next morning, then something is wrong with the escape or else brood above. The same plan may work over a super, with empty sections, with only a bee-space between the paper and the surplus to be cleaned; but I have never tried it.

JNO. HANDEL.

Savanna, Ill., Dec. 10.

[It is very possible that you have given us a valuable discovery. The escape is so simple and so cheap that it does not seem as if it would be worth any thing; but if, as you say, you have tried it on 75 colonies without a failure, there must be something in it, and should merit at least a trial from every bee-keeper. After mentioning the use of newspaper, you

say punch holes in it with a stick $\frac{1}{2}$ inch square, "sharpened from the four sides." This makes the point, as we understand you, pyramid-shaped, and holes punched with this instrument will be self-closing; whereas those made with the point of a pencil, or any kind of stick with a conical point, would not be. To illustrate, suppose you prepare, as soon as you read this, a stick $\frac{1}{2}$ inch square, pointed as described, and another one of the same diameter pointed like a lead-pencil. Push both through a newspaper, and note the difference. The square stick, with its pyramid point, makes a hole that will tear something in the shape of a letter X. Bees can go through it easily one way; but the other way, the four points coming together close against the bee. The conical point tears out some of the paper. We shall certainly give the plan a trial next summer; but while such an escape would not be a very permanent affair, it would answer admirably in lieu of something more expensive and possibly no better. The number of holes can be increased to facilitate the passage of bees downward; and this is one great point in favor of this novel escape. Oh, say! if you forget to take this escape off afterward, the bees will do it for you, bit by bit.]

RENDERING WAX.

SOAK THE COMBS BEFORE MELTING: GOOD SUGGESTIONS.

In the recent discussion regarding the rendering of wax in the most economical manner, the chief reason for soaking the combs seems to have been overlooked. It is recommended to soak the slungum, but it is the combs that should get the soaking. Soak them in acidulated water (2 lbs. sulphuric acid to a barrel of water) until the pollen and such parts of the cocoons as are not impervious to water by reason of propolis are thoroughly saturated. This not only decomposes these substances, but prevents their absorbing the wax, provided the melting process does not cause the evaporation of the water. Even if these substances, by reason of a ~~small~~ ^{large} amount as in a solar extractor, do absorb some wax, it is far easier to get it from this slungum than from that in which the combs were not first soaked.

I use my solar extractor only for cappings, bit ^{or} new combs, etc. The old combs are broken up and "put in soak" until I am ready to render them, when they are dipped out and melted in a large kettle. This hot mixture of wax, water, etc., is poured through a double strainer into a settling-can. The upper strainer is of wire cloth, and the lower of cheese-cloth. The matter that is caught in the upper strainer is, while still hot, returned to the kettle, and boiled in strongly acidulated water. It is then poured into a cloth bag, and all fluids are squeezed out by twisting the bag up tight. The wax is afterward clarified by the usual process.

Old combs containing granulated honey are rendered ^{when} are uncapped and subjected to slungum until the honey is melted. A solar extractor, carefully watched, will do this work nicely, and scarcely start the wax. After the honey is out, the combs are treated the same as old combs.

The refuse left by the foregoing process is hardly worth burning. I wish to emphasize the fact that great care must be used in handling sulphuric acid. Never pour water into the acid, but pour the acid slowly into the water.

ARTHUR C. MILLER.

Providence, R. I., Dec. 12.

[The idea of soaking the combs before rendering the wax is no doubt good. We have never tried it, but will do so at the earliest opportunity. We set the last sentence as above in italics, because it is very important. We have given the same caution once or twice before, but it will bear repeating again. Our readers will remember the writer as the one who first *succesfully* used a heated plate for fastening foundation to sections.]

O. R. COE'S METHOD OF RENDERING WAX WITH AN OLD EXTRACTOR-CAN.

Friend Root—My method of rendering wax from old combs is so much easier, simpler, and better (in my estimation) than any other I have seen described in any of the bee-journals that I can not forbear giving it, for the benefit of others.

I take an old honey-extractor can that had a home-made reel in it, and, taking out the reel, I fill the can $\frac{3}{4}$ full of water and heat to the boiling-point. I now throw in a lot of old comb and stir it up well. I now take the perforated tin pail or basket that I had made to use in a Swiss steam wax-extractor, and suspend it from a screw-hook in the ceiling overhead, so as to hang just over the surface of the hot water. I now dip the refuse from the hot water into the suspended basket; and as the water and melted wax run back into the can I draw hot water from the faucet of the large can and pour it into the refuse in the suspended basket, and thus rinse out the wax from the mass of slumgum. I now take the basket by the two handles and give it a shaking motion, causing the mass to roll over and over in the basket until it is quite dry. It will drain when treated in that way, when it would not if stirred with a stick. If there is yet wax remaining in the mass of slumgum I pour on more hot water, and repeat the process until I get every particle of the wax out. When the refuse is thrown out I fill up the basket with a new lot, treat as before, and continue to add more comb from time to time, until the can gets pretty well filled up with wax. I now lower the basket, empty it into the mass of melted wax on top of the water in the can, and, as fast as the wax strains into the basket through its perforated sides, I dip it off into the pails or buckets I wish to cake it in, and thus get it in nice condition. If one wishes to keep a brisk fire and rush business, keep a bucket of cold water, with a dipper in it, handy by, else it may get so hot as to boil over and make trouble. If one has a large kettle he wishes to use in rendering wax, it can be used in the same manner, if he has water kept hot in a tea-kettle, to use in rinsing the mass of slumgum in the basket; but some large can, like an extractor-can, with a faucet, is much better.

O. R. COE.
Windham, N. Y., Dec. 8.

HEADS OF GRAIN FROM DIFFERENT FIELDS.

THE COLD PROCESS OF MAKING SYRUP FOR FEEDING; HOW TO MAKE A PERCOLATOR.

I notice in GLEANINGS you speak of the expense that would be incurred in making syrup by the cold process. Surely you do not understand the process, else you would know it is really cheaper than the boiling process, as it is no trouble, and requires no fuel. Take a half-gallon or a gallon bottle, and break out the bottom; then in the neck of the bottle insert a moist sponge—not too tight. Fill the bottle

with granulated sugar, then keep the sugar covered with water. You will find a first-class syrup, dripping from the sponge—one that will not sour nor granulate; is no trouble, and not expensive; one unusually heavy. This can be made on a larger scale, and kept for months. When once started you can continually fill up with sugar and water, and keep up a continual percolation.

CHAS. F. HAAS.

Canal Dover, O., Dec. 18.

[We are very glad of the information, friend H., and at the first opportunity will give the matter a careful test. The plan is so simple, if syrup will not granulate, that it will commend itself to bee-keepers, because it would save soiling the "gude wife's" stove, getting up a hot fire, running the risk of scorching, etc. But bee-keepers want to make syrup on a more extensive scale than could be made in a gallon bottle. A tub or half-barrel could be made to answer, providing there was a hole cut in the bottom, say three inches in diameter, with a wooden tube inserted, two or three inches long, having an inside diameter of two inches. This tube would answer for the neck of the bottle, and a sponge could be inserted therein in the same way. Such a device would make the syrup on a larger scale, and would probably meet the requirements of most bee-keepers. The only question that remains is, whether the feed would granulate without something in the way of an acid or honey to prevent it. There may be a chemical reason why syrup percolating through a sponge would not granulate; and if so, perhaps our correspondent can enlighten us a little further.]

WORLD'S FAIR; IMPORTANT FOR WISCONSIN BEE-KEEPERS.

I desire, through your paper, to ask your Wisconsin readers who contemplate making a honey exhibit at the World's Fair to write to the corresponding secretary, notifying him of the fact, and to do it at once, as it is important to the managers to know the probable amount of honey that will be offered for exhibit. The State Society, which meets in February next, will have control of the matter. By notifying the secretary they will receive full instructions.

J. W. VANCE, Cor. Sec.

Madison, Wis., Dec. 8.

PERFORATED ZINC WITH ROUND HOLES IMPRACTICABLE.

I see in the price list that the zinc honey-board is being used for a burr-comb excluder as well as a queen-excluder. Now, I want it to be a pollen-excluder, and I think it can be made that also. Just make the perforations round instead of oblong, and just the distance across they now are. Of course, there will be more of them.

C. STEPHENSON.

Conyers, Ga., Dec. 6.

[The ordinary zinc honey-boards do exclude pollen to some extent. If the perforations were round, it would no doubt scrape off the pollen, but would make it very difficult for the bees to get through. It would practically exclude not only the queen and drones, but the bees also.]

PRIORITY OF LOCATION; BEES THAT WILL LOOK OVER THE FENCE.

I am "monarch of all I (need to) survey." I believe Dr. Miller owns every thing that is produced on the piece of land he mentions on page 888, including the nectar produced by the flowers, just as much as he owns any other crop raised on it, and it is his privilege to harvest it if he can; and if he keeps bees he can get at least a portion of it; but while his bees are go-

ing for it they look over the fence and see a fine chance to gather some of Bangs' nectar, and then they trespass on his crop. Now, Dr. Miller is a very conscientious man, and does not bring up his bees to do so, but somehow they will do it; and the only way Bangs can protect himself is to keep bees on his side of the fence to take some of Dr. M.'s nectar. It is said, "Doctors never take their own medicine;" but Dr. M. will have to do so in this case.

Lawrence, Ill.

J. L. ANDERSON.

tile and changed its course, making it run back and forth under the beds in the greenhouse. It goes into the house just under the window you see in that three-cornered panel. You will notice a light streak in the ground, running from that window off toward the east. Since the picture was taken I have had another hot-bed made right over this line of tile. Let us now refer to the diagram.

Shortly after the steam leaves the exhaust pipe from the engine, it comes to a point where an inch iron pipe comes from the hydrant into the 6-inch tile. At this point it turns at a sharp angle and goes inside the 6-inch tile, up to the greenhouse. Inside of the greenhouse it leaves the tile, in the center of one of the beds, and goes up under the glass. Then it runs back and forth, and clear around the house, under the sashes, until there are about 100 feet all together, inside of the structure. Then it goes down into the beds again, and back under ground nearly to the hydrant. This last is marked "Return pipe." The water comes into the greenhouse so hot that you can not bear your hand on the pipes. By the time it has made a circuit, however, if the weather is cold the water is comparatively cool. Of course, this depends a good deal on the weather. Sometimes it goes out scalding hot. The operation is as follows:

The exhaust steam, when liberated inside of that 6-inch tile, commences at once to condense into water. In doing this it parts with a great amount of latent heat. A part of this is communicated to the water constantly moving inside of the iron pipe. The larger part, however, goes into the tiling, and from that into the ground: so that, in the course of time, not only the tile, but the ground for several feet each way, becomes warm, so that snow rarely stays over it in the winter. To economize heat, however, we usually have this 6-inch drain tile covered with beds and sashes; or, where the bed is not used, we cover it with boards. You see, the whole thing is automatic. If the engine runs every day, the tiling and the dirt around it accumulate sufficient heat to run the hot-water pipes through the night. Last night, the evening of Dec. 23, the thermometer was very near zero: but the pipes were quite warm this morning, and plants as tender as some Hubbard squashes were unharmed. Of course, I did not plant squashes at this season of the year. I presume the seeds were in the manure used for the hot-beds.

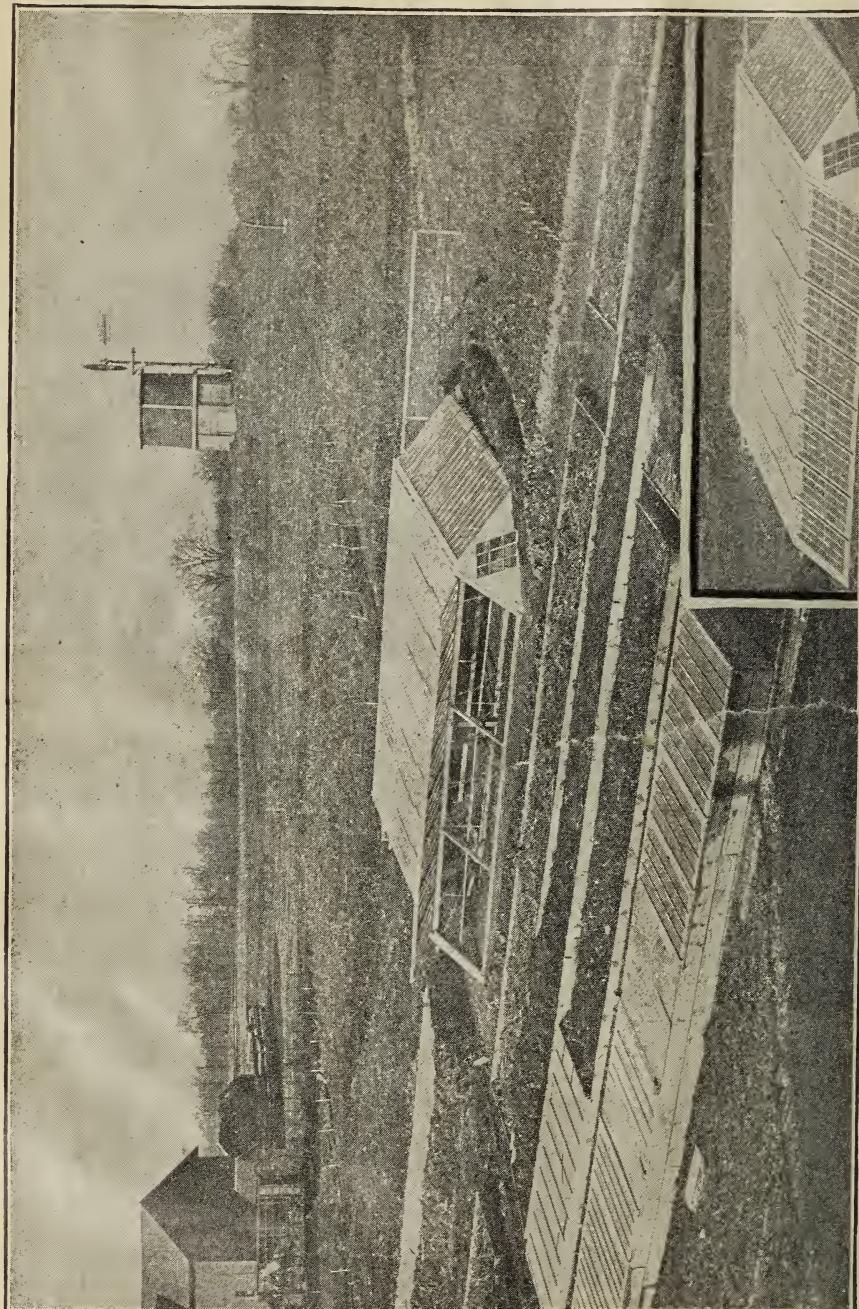
Letter.—This morning, Dec. 26, the pipes in the greenhouse are still warm, although it was 4 degrees below zero last night, with quite a severe north wind. Please notice, the engine stopped running at 9 o'clock Saturday night; and before it was started this Monday morning, the pipes were warm enough, as I have said, to protect the contents of the greenhouse. Notwithstanding the cold on Christmas day, this morning a lot of radishes were found above ground that were not up Saturday. It seems to me almost like some of the stories of enchantment as I go in and sit down in the darkness during a cold winter night, where I can put one hand on the inlet and the other on the outlet pipe. There is no sound to break the stillness—no boiler nor fire, nor any thing. In this perfect quiet, with only the stars to be seen through the glass overhead (twinkling for company), the hidden forces of nature are doing their duty. The water keeps coursing all night long, bringing up the heat from that underground passage, and distributing it where it is needed. Of course, this has not been accomplished without some hard work and faithful experimenting; and I think it will do no harm to add, even here, some *praying* for divine wisdom

HIGH-PRESSURE GARDENING.

BY A. I. ROOT.

STORING UP HEAT, AS WE STORE UP ELECTRICITY IN A STORAGE BATTERY, ETC.

In our last issue, toward the close of my remarks about heating the greenhouse by hot water, I used this expression: "I presume likely the same hot water might be used over and over again after heating the plants or dwellings by hot water; and this would be quite a saving over taking cold water from the hydrant and letting it go to waste while still hot." Well, friends, the thing I suggested has been done, and the exhaust steam is now simply heating the same body of water over and over again. The apparatus is so cheap compared with most heating arrangements, that I have decided not only to give you a picture on the opposite page, but also a diagram of the manner in which it is done. The cut we give you is a view taken from one of the windows of the factory. While Ernest took the first picture, I stood inside the greenhouse and had just operated the apparatus that lifts all together the eight sashes fronting the street. This is done by simply turning a crank. The apparatus comes from Hitchings & Co., of New York city. At the lower right-hand corner is another view of the structure, with the sash all down. On top of the hill is the windmill and tank I have frequently spoken of. At the lower left-hand corner you get a little glimpse of the street that runs between the factory and my hot-beds. Besides using the exhaust steam from that little engine for warming the greenhouse, it was originally used (as it is now,) for warming quite a string of hot-beds. When the factory was first built, a 10-inch sewer-pipe was laid under the street, perhaps three or four feet deep; and this goes down under the basement of our first main building. The engine that works our electric lights happened to be located right over this sewer pipe; therefore, in order to conduct the steam across the street to my hot-beds, it was only necessary to push a 2-inch iron pipe down through this 10-inch sewer-pipe to the engine. In the diagram, the end of this 2-inch pipe is marked "Exhaust pipe." The steam is liberated as it emerges from under the street into the 6 inch tile. This is common drain tile, such as is worth 4 cts. a foot. The drain tile that goes under the hot-beds is only 4 inches in diameter; but as two branches of this could not take care of nearly all the exhaust steam, I afterward laid the large 6-inch tile that you notice in the diagram. This originally went direct from the hot-beds to a point about 200 feet out in the lot, up toward the windmill. You will notice it sticking up out of the ground, a little at the right of the windmill, in the large picture. Before the greenhouse was built, the exhaust steam used to go away up in the lot, and come out of this little chimney, as it might be called. Well, when I decided to build the greenhouse, I took up a portion of that 6-inch



THAT NEW GREENHOUSE HEATED BY EXHAUST STEAM CARRIED THROUGH COMMON DRAIN-TILES,

and guidance; and when each step in the experiment has succeeded, there have been many thanks to God uttered while I was alone with the work I loved. When I adopted the plan of returning the same water, so as to use it over and over again, of course I had to have a stand-pipe to allow the water to expand and contract with the changes in temperature. But after putting this in, I found I could not draw from these pipes to water my plants, and a third pipe, running to the hydrant, seemed to be a necessity. After some experimenting and waiting and watching, I succeeded, however, in dispensing with the expansion tank entirely. This was done by leaving the valve, which you see near the hydrant, partly open, so that the pressure from the windmill tank on the hill constantly remains on the whole apparatus; so that, as it is now, you can draw hot or warm water from any part of the house for any purpose whatever. By the way, what a fine thing this would be for a dwelling-house! You could get hot water or warm water from any part of

raised so little above the surface of the ground that there is not much danger of freezing, even if used for a cold greenhouse. Then the operator can at any time go inside of it and around among the plants, regulate the temperature, gather his product, sow seeds, do transplanting, or any thing of the sort. Such a greenhouse costs but little compared with the structures used by florists, and the glass can be quickly taken off and stored away when the season arrives when glass is no longer needed.

As it may be of interest to know just how we lay out the beds and paths, we submit an additional diagram. The paths are cut down just deep enough so the workmen can stand upright under the sashes and timbers that hold the sashes. In the highest part, this brings the paths about a foot below the surface of the ground, while down at the south side, where your humble servant stood while he operated the elevating machinery, the path is about two feet deep. The dirt is held in place by means of pine boards nailed to oak stakes driven into

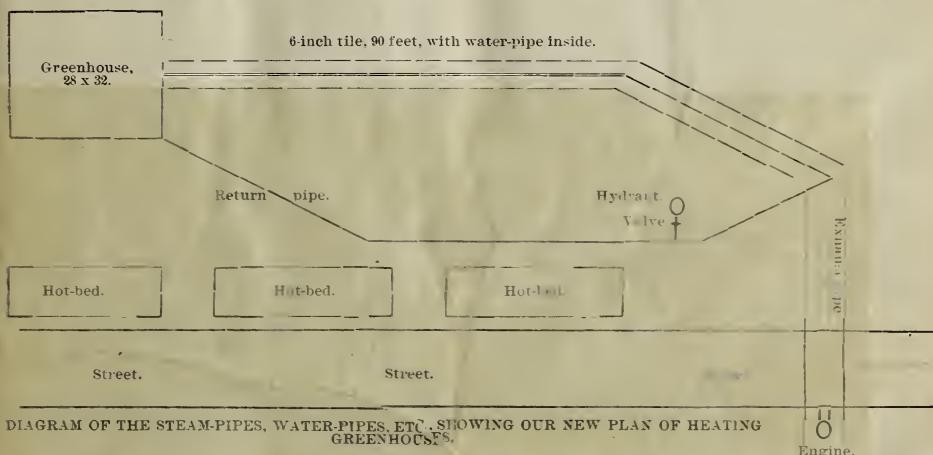


DIAGRAM OF THE STEAM-PIPES, WATER-PIPES, ETC., SHOWING OUR NEW PLAN OF HEATING GREENHOUSES.

the house where hot-water radiators were placed, or wherever needed, and the supply could come from the regular waterworks. With this system of heating buildings by exhaust steam, the building to be warmed should be some little distance from the engine—say from 100 to 300 or 400 feet; and if the dwelling were on high ground, all the better.

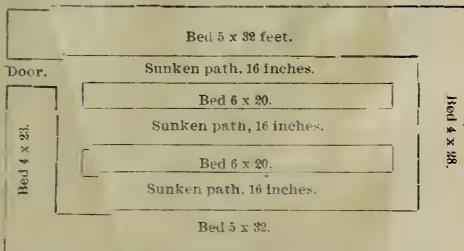
The thing that has astonished me so much is the amount of heat furnished by the exhaust steam from so small an engine, with so cheap and simple an apparatus. We are just now considering a similar arrangement to utilize the heat that may be given off from the exhaust steam from our large 90-horse-power engine. A considerable part of it is already used for warming our factories; but there is a great surplus, even at this moment, spouting out into the frosty air.

On the left of the greenhouse you will notice a string of sashes banked all around with coarse strawy manure. This is the new celery culture I have been telling you about. It grew nicely all through the fore part of December. Since our zero temperature, however, I have not dared to take off the sashes. I feel pretty sure, nevertheless, that the celery is all right. It has no steam heat under it, for celery is very apt to rot with much bottom heat. It is a difficult matter to regulate the heat, any way, in hot-beds, during zero weather. On this account I greatly prefer a low greenhouse, something like the one given in the picture. It is

the ground. The beds are almost half manure for a depth of 12 or 18 inches.

SOWING TURNIPS FOR A LATE CROP.

I mentioned, a while ago, that we usually put in a sowing of turnips quite late. Well, this season our late turnips grew all through November, and made quite a growth, even during the fore part of December. We some time ago



PLAN OF THE BEDS AND SUNKEN PATHS.

gathered all we supposed were large enough; but seeing they were getting to be of good size, I told one of the boys to gather enough for dinner, and if they were uninjured by frost he might gather all that were of sufficient size. To my astonishment they were the sweetest and nicest turnips of the season. Burpee's Breadstone turnip is remarkable for standing a

very low temperature, and it also keeps much better than the common flat or round turnips; and for a table turnip, my opinion is there is nothing in our seed catalogues to compare with it. At present we get 25 cents a peck for the Breadstone, but only 10 cents a peck for the Purple-top Globe. You might ask why we do not raise *all* Breadstone. Well, it requires a longer season, like the rutabagas; but the Purple-top Globe grows so quickly we can put them in the ground after other crops that are gathered quite late.

NEW PLANTS AND NOVELTIES FOR 1893.

Although we are constantly experimenting with the novelties, we do not find many things each season enough better than our old varieties to warrant giving them a place in our catalogue. When we do get something valuable, however, it often repays us for all our experimenting. I have several times taken some special vegetable, and planted every variety I could find in our most voluminous seed catalogues. The verdict has so often been, "No improvement in any of them," that it is getting to be rather monotonous. During the past season, we have given a careful test to Henderson's Country Gentleman corn. It is certainly a stronger grower, and has larger ears, than the Shoepeg, while the quality is just as good. Very likely it has been developed from the Shoepeg; but when planted side by side with it in the same ground, it shows a very distinct superiority. Onions, melons, and a great many other things, during the past season, seemed to sport more than usual. In other words, the seed did not seem to be true to name. After I noticed that our Experiment Station had the same trouble with onions, I began to think it was something in the season. I can not quite understand, however, how the season should make Prizetaker onion seed show a greater number of red onions, as well as the usual straw color. I can, however, understand how so much wetness might make them *badly shaped*, and perhaps it did.

The trade in onion-plants raised in hot-beds and greenhouses will probably be a remarkable feature during the coming season. The greenhouse I have shown you is admirably adapted to this business. For raising onion-plants to put out in the field, no heat is really needed, for they need not be started till February or March. If started in February you will perhaps need some bottom heat, such as you get from fermenting manure. I shall commence sowing onion seeds in our hot-beds and greenhouses in January. The little plants must have lots of sunshine. They get contrarily, and refuse to grow unless you have your beds where the sun can strike them full and square. Celery-plants, however, will do nicely, even if they do not get a bit of sunshine at all; therefore you can give your celery-plants the shaded beds. Pie-plant does just as well without a bit of light; in fact, we get the handsomest stalks in a dark cellar. L. L. Langstroth, while here, told me that pie-plant can be forced in an ordinary cellar, without heat from fermenting manure, or any thing else. My impression is, the cellar should be rather warm, or you should use a warm place in the cellar. Asparagus, also, grows very well in the dark; but I think it makes larger and stronger shoots where it can have some sunshine. I have never tried raising peas under glass; but we have some just now coming up in that new greenhouse. While I think of it, who has raised the Free-man potatoes during the past season? and has anybody got any for sale? It does not seem as if we should let friends Terr. and Maule monopolize so good a thing much longer.

OURSELVES AND OUR NEIGHBORS.

How amiable are thy tabernacles, O Lord of hosts! My soul longeth, yea, even fainteth for the courts of the Lord; my heart and my flesh crieth out for the living God.—PSALM 84: 1, 2.

It is a bad plan for Christian people to travel on Sunday. I know it is bad, in the same way that Mark Twain knew it was bad to tell lies. Somebody asked him what made him so positive in regard to the matter, and he said he knew by experience. In the same way, I know by experience that it is bad and demoralizing, for one who professes to be a Christian, to encourage Sunday travel. I am not going to lay down rules that will apply to all people and to all circumstances; and, in fact, I am not going to lay down any rules at all. I am simply going to give you a little experience that Mrs. Root and myself had when we thought we were obliged to travel and do business on Sunday. When we got ready to leave El Paso we found that, by taking the *first train*, we could only reach New Orleans some time Saturday night or Sunday morning; but when we got on board I supposed we could stop over, but found afterward we could do so only by buying new tickets; and as the *sleepers* was paid for through to New Orleans, we should also lose our sleeper tickets. Under the circumstances there was really nothing to do but to decide that, as soon as we reached New Orleans, to get a boarding-place somewhere near the depot, and then get to church as soon as we could. We reached New Orleans about two hours before church time, and I left Mrs. Root at the depot waiting-room while I sallied forth to find some sort of home during our week or ten days' stay in the city. I did not leave her in the waiting-room, after all, for the beautiful June morning called her outdoors, as it did almost everybody else. Even though it was the last of February, peach-trees were in bloom, things were coming up in the gardens, trees were leaving out, etc. When I started out to find a lodging-place on Sunday I felt guilty. It is true, we might have gone to a hotel; but we did not want to pay hotel bills, and we thought it would be better to find a quiet lodging-place, even though it was Sunday. I had been in New Orleans before, but some way that Sunday morning I didn't remember the lay of the city very well. I thought I would keep a little out of the business part, and therefore I strayed back into the oldest part of the city, as I was afterward told. The houses were all old, and exceedingly dirty. The paving-stones in the street looked as if they had been worn by the tramp of centuries; and although I walked a mile or two, I could not find a single spot but that looked as if it also held the accumulation of the *filth* of centuries. The people where I applied for rooms were dirty and disgusting. At first I did not stop at all where the surroundings looked so forbidding; but I got tired and sweaty, and it was getting near church time, and then I became nervous, because Mrs. Root would wonder where in the world I could be so long, and I thought we should have to put up at some *sort of place*, at least until Sunday was over. So I became desperate. Not only were the prices higher than any thing I ever heard of before, but when I looked into the rooms I felt sure that Sue would never consent to even step over the threshold. Why, dirt and filth and disorder were no name for it. I finally found a public square where there was a garden, flowers, monuments, etc. but even the garden and flowers looked dirty and sorrowful; and overlooking this square I found a room considerably better—that is, there

was more tawdry finery about it; but the woman who had it in charge wanted \$2.00 a day just for the room alone, to say nothing of board. Sick at heart, guilty in conscience, and homesick withal, I decided we should have to take this—at least for one day. Then somebody told me I could get a nice room at a low price, but the man who owned it was clerking in a saloon, and I must go into the saloon to see him; and on the principle that drowning men catch at straws—no, no! it was not *quite* so bad as that, I know, but I felt a good deal that way—I ventured for the first time in my life to enter a saloon on *Sunday*, and it was a New Orleans saloon besides. Oh dear! to think that anybody can want to stay in such a place, amid such talk and such surroundings, and especially on God's holy day!

So far I had abstained from riding on the street-cars; but I was so sweaty and used up that I felt that I must have relief. Besides, if I should attempt to go back all the way on foot we should never get to church at all. Oh how I did long to be with Christian people as they gathered into a Christian church about that time every Sunday morning! I thought of the words of my text at the head of this talk, and I felt them as I never did before. Was it possible that David felt as I did when he said, "My soul longeth, yea, even fainteth for the courts of the Lord"? At any rate, those words seemed better fitted to express my feelings than any language I could ever have framed myself. It seemed as if I had traveled almost all over the whole great city of New Orleans: but I was honest when I told Sue that I had not found even one decent home for human beings. Toward the close of my walk I met people on the way to churches, with their Bibles and hymn-books; but somehow even these people did not look like the Christians I had been wont to meet with on Sunday. I suppose my guilty conscience was at the bottom of the whole of my feelings that morning. When I told Sue the situation, she said at once that we should go to the nearest hotel and then go to church. But, lo and behold! there were no hotels near the depot. There were some low whisky-shops that did a little hotel-keeping as a kind of side issue, but we felt as if we could not go there. Everybody recommended us to the St. Charles; and, even though it would cost \$4.00 a day for each of us, we decided it was the shortest cut toward "remembering the Sabbath day, to keep it holy." Of course, we had to ride on a street-car, for the St. Charles was two or three miles away. It was the same car I came up on; and I knew that my companion must be more shocked than she ever was before in all her life, by the sights that met my eye as I came up. It was where the car passed the French Market. She soon began to make protests as we came near people in the rush and whirl of busy traffic on God's day. I told her to wait a little and she would be astonished still more. A little further, and a great crowd of people—thousands, in fact—were "hollering" and yelling, and jostling each other, while auctioneers, street-fakirs, vendors of all sorts of games and tawdry finery, made such a hubbub and roar in their efforts to shout the merits of their wares, that it was like a little *Han* of earth.

I have forgotten just what Sue said, but it was something like this: "Why, husband, is it possible that here in the United States, and on God's holy day, there can be found such a disgraceful scene as this?" When I was talking to a friend about it afterward he replied, "Oh! the thing is not *near* as bad now as it used to be years ago. They have stopped the drinking, and quieted down the disorderly

element, so it is quite respectable now to what it was once."*

We finally came on to a street that *did* contain some nice stores and buildings; but it was full of people, and there was little to indicate to anybody that it was other than a week day. We approached the great St. Charles Hotel. When I thought of mixing in with that busy crowd there, it seemed to me as if I could not stand it. I had been praying to myself for quite a little while—yes, my heart had been full of prayer and promises to God, that, if he would deliver us this time, as he had so many times before, I would try hard to avoid being obliged to travel on Sunday hereafter. Then somebody touched my arm, and a pleasant-looking man said, "Excuse me, friends, but I take it you are strangers here, and may be you would like quiet and respectable accommodations right in this neighborhood, where it will cost you only half as much as at the St. Charles." I said at once that he was just the friend we were looking for; but Mrs. Root suggested that we look at the room first. I felt as if I would take any thing with my eyes shut just then, providing I could get it of somebody who talked and acted in such a friendly way as did that man. We were ushered into the room, that cost two dollars a day each, including board. As soon as the door was closed, I said, "Thank God, we are finally where we can get ready for church." I had taken it for granted that our room was quite respectable: but when I expressed as much, Sue took hold of one of the pillow-slips and stripped it back. There it was—grease, dirt, and filth, simply *covered* up by a thin bit of starched white cloth. Then she lifted a portion of the carpeting with her foot. Now, in our home, if you lift a carpet or pillow-slip you will not find *any* thing *out* of sight that does not correspond with what is *in* sight. The carpets and *etc.*, and every thing that will hold dirt, get out on to the clothes-line, and get such a spanking that they ought to remember it ever afterward. We were alone. I put out my hand to my wife, and we knelt down and asked God to take us poor helpless sinners into his care and keeping. Then we hastily slicked up, and joined the crowd of people that were on their way to one of the large fine churches in New Orleans. The simple fact of joining in with a lot of people who looked and acted like Christians, was like balm to our troubled souls. There was an immense audience, and the sermon was a grand one—just such a one as you might expect for such a nice, clear, intelligent-looking congregation of people. Toward the close of his remarks the preacher spoke of the beautiful monuments to be found here and there all through New Orleans. He spoke of the beautiful statue of Margaret, that I have described to you before. Then he used words something like these:

"My friends, why have the people of New Orleans fit to thus preserve the memory of our departed great? Did the man whose marble statue we see in the park in front of this church with his right to be thus remembered by

*In all my travels, north, south, east, and west, I had never before come across any such state of affairs as met my eyes and ears that Sunday morning in New Orleans. San Francisco has been called a wicked city; but I have been in almost every part of it, and on Sunday too, and yet no such din and clatter and disorder and uproar ever before came to my ears. Still, the people in and around that French market seemed to take it as a matter of fact and an everyday occurrence. The nearest approach to the scene I have ever seen is the crowd around a low-lived circus just before the door is open. Before beer-selling and gambling were banished from our State fairs, we used to see, years ago, something a little like it, only on a smaller scale.

saying in his life, 'Great am I, and I will prevail?' No, no! We have men in our land who *imagine* themselves to be great—those who think that by their money they can command the respect and the esteem of their fellow-men; but we never build monuments to perpetuate the memory of such. The one whose statue stands so near this church never *thought* of self. He was forgetful of self. He did not even try to make money and get rich. He said, 'Great is truth, and it will prevail,' and he magnified the name of *Jesus Christ* instead of parading himself. That is why he became *great*, and that is why we feel proud to think that such a man ever lived, and thank God for his memory as we pass by the beautiful piece of work with its surroundings dedicated to his memory."

I am sorry that I have given the above so poorly and imperfectly. The thought was presented by one of our finest scholars and greatest orators. As soon as church was out, we hastened to see whose name was carved on the monument that was chosen to grace the center of the beautiful park. Sure enough, it was the name of Benjamin Franklin. This park, in front of the church, was clean, refreshing, compared to the locality I traversed in the morning.

After we got home from church I remembered that I had in my pocket a letter from J. W. Winder, whom I used to be a little acquainted with when he was a bee-keeper in Cincinnati, some twenty years ago. I left Mrs. Root in our room, while I hunted up friend Winder; and, sure enough, he was "friend Winder" that Sunday afternoon, in every sense of the word. Almost his first words were, "Why, brother Root, why did you not come right to me? I had a room engaged for you. I expected that you would, of course, come right there and bring your wife." Then I hurried back as fast as I could to Mrs. Root. We paid a dollar for the use of the room while we were gone to church, and then came the answer to our prayers of the morning. Sue had been saying that she felt as if she must have a little rest where she could look out upon green grass and flowers and trees; and Mr. Winder had chosen a real gem of a place for us. When I looked at it and contrasted it with my adventures of the morning, it seemed almost like stepping from earth to heaven. The lady who owned the rooms was a devoted Christian, and we soon became fast friends. She took us to their services at prayer-meetings, and they wanted me to speak to the Endeavor Society; and then friend Winder wanted to introduce me to a young man who had given up tobacco because of the folks in GLEANINGS; and after he had given up tobacco he felt as if he would like to go still further and become a Christian; and I hear him give his testimony at the Endeavor Society. Then friend Winder took us to hear a Methodist preacher who is devoting his life to looking up the children who are employed in the factories in New Orleans. But I shall have to tell you about this in my next paper. In the present one I have given the dark side of New Orleans. Now just wait a little and I will show you some of the bright side, for there are Christian people and beautiful churches and devoted pastors doing God's service valiantly there as elsewhere; and there are beautiful clean homes and fine gardens and residences that will compare with any thing we have anywhere. Folks who travel on Sunday do not, as a rule, get a glimpse of the best people and the best things in this world, and they need not expect to.

I afterward discovered that he difficulty I found in getting rooms, especially in that part of the city, and the high prices that were asked for very indifferent ones, was owing to

the fact that our arrival in the city was just a little before the advent of the Mardi Gras carnival, and almost every thing in the shape of a lodging-place is usually engaged, oftentimes at enormous prices, weeks beforehand. I make this explanation lest I should leave the impression that our Southern friends are, as a general thing, exorbitant in their prices for accommodations. In my next I will tell you how many of the necessities of life can be procured in New Orleans for less money than in almost any other city in our land.

THE OLD MISSION CHURCHES OF THE PACIFIC COAST.

When I spoke of these, and mentioned going inside of the old church at Paso del Norte, I had never been told that the Old Mission people were Roman Catholics. You may think me stupid, but it is nevertheless true. Somebody told me they were a sort of Jesuits; but that did not convey any particular meaning to me. I certainly had no intention of hurting the feelings of any one of my readers, and I humbly beg their pardon for my carelessness. Quite a number of long letters have been received, explaining quite fully the faith of the Old Mission people who pushed their churches and their teachings far into the wilderness of the Pacific coast years ago. Now, dear brothers and sisters of that Old Mission church I spoke of, and wherever else you may be found, will you not join with the rest of us in waging war against wickedness and sin wherever found? And may we not hope that the bull-fights, described below, that are held so near to that very old church, may soon be either stopped altogether, or made to go a little further away from its sacred precincts?

BULL-FIGHTING, AND THE OLD MISSION CHURCH AT PASO DEL NORTE.

We take the following clipping from the *Penny Press*, of Cleveland:

FIVE BULLS TORTURED AND TWO HORSES KILLED.

EPASO, TEX., Dec. 7.—Bull-fighting was a feature of the annual festa at Juarez, Mexico, just across the Rio Grande from this city.

The ring adjoins the old church, for the Mexicans believe in bull-fighting as firmly as they believe in their creed, and make it a leading feature of the church festivals.

Three thousand people saw five bulls tortured, two horses killed, and another wounded. The first bull turned in refused to fight. The second was not as big as the first, but had plenty of fight. He sent the torreadors behind the blinds in a hurry, and brought first blood by hooking one of the men in the hand. The three other bulls brought in made good fights.

There were several narrow escapes, and two fighters were caught, but not seriously hurt. These incidents set the Mexicans to yelling frantically.

Two horses were killed under one picador, and a third was severely hooked. The horses were blindfolded, and wholly dependent upon the science of their rider for protection from the mad rushes of the bulls. But the fellow handled the pike clumsily, and utterly failed to keep off the bull, whose sharp horns would penetrate a horse's side, and horse and rider would be thrown to the ground. The picador was rescued while the infuriated bull was goring the horse.

The last bull was killed by the picador at the first thrust of his sword, which entered between the shoulder-blades and cut the beast's heart in two.

And this, dear friends, occurred only a few days ago. If not exactly in the United States, it was just over the line, an easy walk from Uncle Sam's domain. Truly there is a field for missionary work right close to our boundaries. I have thought best to give it, as it corroborates what I said in my description in regard to locating the arena for bull-fights so near the old church.



Butter and honey shall he eat, that he may know to refuse the evil, and choose the good.—ISAIAH 7:15.

WE are enjoying a "cold snap" just now. How are those bees?

By the time this number is in the press we (Mr. and Mrs. A. I. R. and E. R.) expect to be in attendance at the North American convention in Washington.

WE wish to call particular attention to a novel paper bee-escape, described in another column, that can be made for less than a cent each by anybody, and by the hundreds, with no other instrument than a pine stick.

ONE of the drawbacks to the business of keeping bees is the *uncertainty* of the honey crop. Rambler, in this issue, in his comparison of the honey industry to that of the making of beet sugar, brings this in strong contrast.

On page 588, Dec. 1, friend Golden uses the expression, "in all stages down to eggs, and not a queen." He meant to say, "*not a queen missing.*" In correcting his manuscript he accidentally scratched out the "missing" word. The word seems to have been "missing" all round.

ALTHOUGH Bro. Hutchinson was severely criticised on account of his course in the sugar honey matter the last number of his journal shows that he stands fire well. Instead of "getting mad," nothing daunted he accepts the criticisms in good part, and goes ahead and gets up a unusually good number of that already excellent paper, *the Bee-keeper's Review*.

WE had hoped to close the discussion on sugar honey in this issue as previously announced; but as it is such a "red-hot subject," and as two more of our able correspondents beg to be heard, the matter will have to run over into our Jan. 15th issue, after which time we must positively refuse to entertain further discussion, at least for the present. Perhaps some of us "didn't know it was loaded."

THAT picture of the Rambler at the World's Fair, and the general remarks on matrimony, by the senior editor and Dr. Miller elsewhere in the same issue (Dec. 1), raised a perfect storm from the bachelors in California. We give, in another column, a good sample of how one bachelor feels. His article is not exactly a storm of abuse nor a howl of protest, but a bright, witty rejoinder, and a facetious dissertation on the character of the Rambler. We have come to the conclusion that it is risky business dealing in futures, especially in the line of matrimony, and, and—perhaps some of our bachelor friends have felt just so before.

FOOD AND FUEL—HOW THEY ARE WASTED.

SOME good authority on heating dwellings says that, with many of the open grates and fireplaces, nine-tenths of the heat goes up the chimney, and only one-tenth is utilized for warming the room. Another good authority states that, when we swallow our food the majority of people do when they eat their meals, three-fourths of it goes off as waste, and only one-fourth nourishes the body. So you see you will really save money by eating slowly

and chewing your food until the machinery of the digestive apparatus can get hold of and utilize every bit of it.

A. I. R.

CHESHIRE AND COWAN ON DIGESTION OF NECTAR, AND DIGESTION IN GENERAL.

On page 10, Prof. Cook makes a couple of quotations from Thos. W. Cowan's excellent work, "The Honey-bee," in which he, Cowan, seems to corroborate Prof. Cook. Some time ago when this matter of digested nectar came up, Mr. Cowan sent us a letter in which he differed quite materially from the position of Prof. Cook on the matter of digestion. This letter was forwarded at the time to the professor, but was by him inadvertently mislaid, and hence was never published. Now, if two such great lights hold different views on the subject of digestion, will it not largely modify the force of the quotations so far as they may support Prof. Cook's position? In all of this discussion a great deal hinges on what we mean by digestion, or what definitions we may accept. Now, with regard to Cheshire, if we understand the matter correctly he does not support Prof. Cook's position at all. The quotations which we herewith present from Cheshire's Bees and Bee-keeping, Vol. I., were first pointed out by W. F. Clarke, in the *Bee-keepers' Review*; and as they answer our purpose, we reproduce them here. The first one appears on page 60, Vol. I., and reads as follows:

Let us now investigate in detail the stomach-mouth and chyle-stomach. We have already learned that the first of these enables the bee to store honey, which, although carried within her body, does not enter her digestive system.

The second one, on page 65, reads thus:

The honey-sac of the bee corresponds to the crop of most insects. When nectar is gathered by the foraging bees, it is simply held in store in this cavity, the processes of digestion in no true sense beginning until the next chamber, the chyle-stomach, is reached.

To make sure we were right, we verified the quotations as above, and find them, as furnished by Mr. Clarke, to be correct, by the volumes of Cheshire we have.

CUT NAILS VERSUS WIRE NAILS FOR BEE-HIVES; WHAT NAILS TO USE FOR DIFFERENT KINDS OF WORK.

WE notice by the New York *Tribune*, that "cut nails have been determined, after a government test, to be superior to wire nails in holding power." This verifies our personal experience exactly. It is a great mistake to use wire nails to fasten sidewalk boards to the runners (or stringers). If you will take notice, you will see that all such boards secured by wire nails will show the heads of the nails sticking up in a few months, anywhere from a thirty-second to an eighth of an inch above the surface of the wood; but not so with cut nails. They ever stick up unless the wood is worn or rotted away around them.

A couple of years ago we owned, as some of our readers remember, a kicking horse. He took particular delight in battering the side of his stall, or a sort of barricade that we had constructed and fastened with wire nails, to keep the horse in the next stall from being kicked; but every two or three days we had to drive those wire nails in again, because the continual battering would result in leaving the heads of those nails sticking up from a sixteenth to an eighth of an inch. Unless they were "driven home" occasionally, the whole structure would have tumbled down. But, drive on those nails as much as we would, we could not get the boards to "hug" together tight. We had almost decided to use screws, when the

thought occurred to us that *cut* nails, from their wedge shape, would hold the boards together all right. The experiment was so simple that we tried it at once; and the result was, that that barricade stayed up without any more fussing with it.

The wire-nail catalogues will give you very nice engravings, showing you how the cut nail breaks the wood, and how the wire nail simply passes through the grain, making a nice smooth round hole. All this is true to a certain extent; but as a cut nail is wedge-shaped, the further it is driven into the wood, the more it *draws*; and when it is driven clear up to the head, the broken parts of the wood are wedged up tightly against the surface of the nail; and as soon as a hammer is applied to draw the nail out, the particles of wood lying against the nail begin to assume their former position, but can not, as they now have the nail to press against; and the harder the nail is pulled, the tighter these bits of wood bind, until the hammer forces them from their position; and this pressure is made much harder, it should be remembered, by the greater roughness of the cut nail as compared with the wire.

If, for any reason, a couple of boards are sprung apart, wire nails will fail to *draw* them together; but a cut nail will make them "hug." Now, the point is right here: That for bee-hives of $\frac{1}{2}$ lumber (it doesn't matter so much with Dovetailed hives) we want a cut nail that will make a tight, close joint—one that will make the edges of the board hug together. On account of the danger from splitting, a wire nail is better for $\frac{3}{8}$ hive lumber. Wire nails are also better for use in crating; they are nicer for finished and all small work; and those not accustomed to nail-driving can generally use them with better success; they are also cheaper; but in the hands of a person more or less expert, the cut nails for bee-hives of $\frac{1}{2}$ inch boards will be found to be better. The wire nail, although it pulls all the way, *starts* easily. A cut nail starts very hard; but when once started it comes easily—easier than the wire nail, as it pulls or binds on only *two* sides. Practical carpenters will not allow wire nails to be used in sheeting houses, for that very reason. They want a nail that starts hard. If it starts hard, it probably will never start.

TRY IT, AND SEE WHETHER IT IS ALL RIGHT.

There is a certain kind of lack of faith, or to call things by their proper name, there is a certain kind of *stupidity* about humanity that vexes me more than almost any thing else. When I sat down behind the bench, and used to repair watches, years ago, every little while a watch would be sent to be repaired, when it simply needed winding up. Sometimes the owner had come quite a distance, or had sent his watch by his neighbor, with the statement that it would not go. I got so used to this that I always applied the key the very first thing, to see whether the owner had not forgotten to wind his watch. Year after year this same state of affairs kept going on. Sometimes the owner would almost get mad, he was so sure he had wound it at the regular time. Frequently I would hand it back to him, with a remark something like this: "Here, my good friend, just take your key and wind it yourself. Perhaps you will then be convinced." I suppose watch-repairers are having the same thing to contend with, even now. But it is not alone the case with watches. Last week the cook informed me that she had no place to pour her slops and dishwater. Then she explained that she had been carrying them quite a distance through an adjoining room to a sink in the wax-room. Some repairs in the latter cut

this off. Right by her cooking-stove is a sink with a proper trap, that was put in years ago, at considerable expense. I asked her why she did not use it, and she said it had been stopped up for the past two years. "Why, my good friend, you don't mean you have been lugging all your slops into the wax-room for two years past?" She admitted that she had done so. This morning I got the plumber, with wrenches and tongs, and instructed him to take up the whole structure, and make it work, no matter what it cost. Now, he, like the jeweler, had probably learned to try things, and *see*, before he decided they wouldn't work. He called for a pail of boiling water, and, lo and behold! it went out in a twinkling. Another and another followed, and the cook was obliged to admit that there was no obstruction whatever. Long ago it *did* stop up, and she had to dip her slops out again. I can not find out why I was not informed of the matter promptly. Perhaps they thought I had too much care and worry. Some time ago an adjoining sewer-pipe was flushed very thoroughly with steam and hot water, and this likely cleansed out also the pipes of the kitchen-drain; but she had got it into her head that it would not work, and so she never tried it any more.

A few minutes ago the vegetable-wagon was standing before the door, in a zero wind, while the driver lugged from somewhere a pail of water for the horse. The horse stood close to the hydrant. "Why, what in the world are you stopping to carry water for, boys? Isn't that hydrant all right? Have you tried it?" Why, no, they hadn't tried it, but they supposed it was frozen up. I had been wondering why folks were not using our watering-trough lately; and I then remembered that, last week, while we were putting in the pipes to the greenhouse, the water was shut off from that hydrant an hour or two. Somebody started the report that it was frozen up, and no one had tried it since. In the same way, a slanderous report starts about a neighbor. It is passed around from mouth to mouth, and everybody believes it. If you should say to one of them, "Why, my friend, the idea is preposterous; have you asked Mr. A about it?" the reply would probably be, "Why, no; I have not said anything to *him* about it. But everybody says it is so, and I guess it is."

Go straight to the man himself, and he will explain to you in a minute that it was simply a great blunder, started, probably, because somebody jumped at conclusions. Now, then, before you say the sink won't work, or the hydrant won't work, or that your watch or clock will not go, or that your neighbor has turned rascal, do, for Heaven's sake, take the trouble to see whether it is true, or only a notion that you and other people have got into your heads.

A. I. R.

THE WASHINGTON CONVENTION.

We have just returned from the Washington convention. While the attendance was not very large, the quality and high character of the discussions was of the very best. We were honored with the attendance of four government officials—Hon. Edwin Willits, the Assistant Secretary of Agriculture; Prof. Wiley, Chief Chemist; Dr. Riley, Entomologist; and Frank Benton, an assistant. The addresses from all four were listened to with marked attention, and we hope to give a report of them in our next. We had the pleasure of a personal interview with Prof. Wiley, the chemist whom the bee-journals have so severely criticised. We find that he is not only an able chemist, but a pleasant gentleman. We surely have misunderstood him in the past.